DOCUMENT RESUME

ED 080 364 SE 016 617

AUTHOR Tingle, H. Burton
TITLE Algebra [Student's Individualized Career Source Package].
INSTITUTION Sahuarita High School District 130, Ariz.
PUB DATE May 72
NOTE 212p.

EDRS PRICE MF-$0.65 HC-$9.87
DESCRIPTORS Activity Units; *Algebra; Curriculum Guides; *Instructional Materials; Mathematics Education; Rational Numbers; *Secondary School Mathematics; Teacher Developed Materials; Units of Study (Subject Fields); *Worksheets

ABSTRACT

This is a volume of teacher-developed units to supplement the textbook in a first-year algebra course. The units consist mainly of statements of objectives and student worksheets with some examples and references to the textbook given as aids. Major topics covered are basic operations with signed rational numbers and with polynomials, factorization of natural numbers and polynomials, solution of first and second degree equations, graphing, and radicals. Related volumes in the series are SE 016 615, SE 016 616, and SE 016 618. (LS)

ED 080364

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ALGEBRA

TINGLE

FILMED FROM BEST AVAILABLE COPY

SE 016 617

ED 080364

S. I. C. S. PAK

SERIES: EXPLORATION

GRADE: 9

NUMBER: GM1-726

CLUSTER: CONSUMER AND HOMEMAKING EDUCATION RELATED OCCUPATIONS

AREA: CONSUMERISM

TITLE: LITTLE BITTY PIECES

BY: H. BURTON TINGLE
SAHUARITA HIGH SCHOOL

DATE: MAY, 1972

COURSE TITLE: ALGEBRA

Objectives:

I. Given any set of numbers to be added and/or subtracted and/or multiplied and/or divided, you should be able to give the correct answer with 90% accuracy-whether they have grouping symbols or not.

2. You should be able to give in writing the correct definition of a variable.

3. Given a set of equations with on variable, you should be able to tell what number the variable stands for with 90% accuracy.

4. Given a set of equations with 2 or more variables, and the numbers the variables represents, you should be able to give the value of the expression with 90% accuracy.

5. Given a set of variables, you should be able to add and subtract them with 80% accuracy.

6. You should be able to add, subtract, multiply, and divide signed numbers with 90% accuracy.

7. You should be able to find the absolute of a set of integers with 95% accuracy.

8. Given any set of equations with only I variable and that variable in the first degree only; and all numbers being rational, you should be able to find the solutions with 80% accuracy.

9. You should be able to add, subtract, multiply and divide signed numbers with 90% accuracy.
10. You should be able to find the absolute of a set of integers with 95% accuracy.
11. Given any set of polynomials, you should be able to add them together with 80% accuracy.
12. Given any set of polynomials, you should be able to subtract them with 80% accuracy.
13. Given any set of polynomials, you should be able to multiply them with 80% accuracy.
14. Given any set of polynomials, you shoulb be able to divide them with 80% accuracy.
15. Given any set of algebraic fraction, you should be able to add, subtract, multiply or divide them with 80% accuracy.
16. Given any set of algebraic fractions, you should be able to reduce them to lowest terms with 90% accuracy.
17. Given any set of real number, you should be able to express them in simplest radical form with 80% accuracy.
18. Given any set of real numbers, you should be able to add, subtract, multiply and divide them; and give the answer in simplest terms with 80% accuracy.
19. Given any set of points, you should be able to graph them on a rectangular co-ordinate system with 90% accuracy.
20. Given any set of equations of lines in two dimensions, you should be able to graph them with 90% accuracy.
21. Given any set of equations of lines in two dimensions, you should be able to identify the slope and the intercept with 80% accuracy.

22. Given any quadratic equation with rational co-efficients, you should be able to find the solutions with 80% accuracy.
23. Given any set of pairs of linear equations you should be able to solve them simultaneously with 80% accuracy.
24. Given any pair of linear equations, you should demonstrate your knowledge of addition method by using it to find the correct solution.
25. Given any pair of linear equations, you should demonstrate your knowledge of Cramers Rule by using it to find the correct solution.

OBJECTIVES

1. Given any fraction, you should be able to write at least 5 other fractions that mean the same thing as the given fraction.

2. Given any geometric figure with equal dividing mards on it, you should be able to shade in any given fractional part with 90% accuracy.

3. Given any quantity of objects, you should be able to write down how many objects are in any given fractional part of the total quantity with 90% accuracy.

4. Given any fractions in which the numerator and denominator are less than 10,000, you should be able to reduce the fraction to lowest terms with 90% accuracy.

5. Given any positive whole number, you should be able to give its prime factorization with 100% accuracy.

6. Given any set of polynomials in which each term has a common factor, you should be able to factor out that largest common factor with 90% accuracy.

7. Given any set of polynomials which are represented as the difference of 2 squares, you should be able to factor them with 90% accuracy.

8. Given any set of polynomials which are perfect square trinomials, you should be able to factor them with 90% accuracy.

9. Given any set of polynomials which factor as the product of 2 binomials, you should be able to find those factors with 80% accuracy.

10. Given any quadratic equation with rational coefficients, you should be able to find the solutions with 80% accuracy.

11. Given any fraction, you should be able to write it as a decimal number with 90% accuracy.

12. Given any decimal number, you should be able to write it as a fraction in lowest terms with 90% accuracy.

RATIONALE

It would be nice if all our figuring could be done with whole numbers; but many times, we need to talk about parts of things-like part of a dollar, part of a day, pieces of a pie, etc., etc. As a matter of fact, we would probably use pieces or parts more than whole numbers.

Therefore, as a consumer, FRACTIONS are of great importance.

BEHAVIORAL OBJECTIVES

1. Given any fraction, you should be able to write at least 5 other fractio ns that mean the same thing as the given fraction.

2. Given any geometric figure with equal dividing marks on it, you should be able to shade in any given fractional part with 90% accuracy.

3. Given any quantity of objects, you should be able to write down how many objects are in any given fractional part of the total quantity with 90% accuracy.

4. Given any fractions in which the numerator and denominator are less than 10,000, you should be able to reduce the fraction to lowest terms with 90% accuracy.

Pre-Test

1. Write 5 fractions that are equal to $\frac{1}{2}$.

2. Write 5 fractions that are equal to $\frac{2}{3}$.

3. Reduce these fractions to lowest terms.

$\frac{2}{10}$ $\frac{6}{10}$ $\frac{6}{8}$ $\frac{15}{20}$

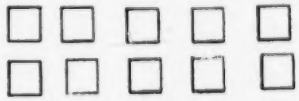
7. Shade in $\frac{1}{2}$ of the following figure

8. Shade in $\frac{1}{3}$ of the following figure.

9. Shade in $\frac{3}{4}$ of the following figure.

10. Draw a circle around $\frac{1}{2}$ of the circle below.

11. Draw a circle around $\frac{2}{5}$ of the squares below.



12. $\frac{1}{2}$ of 20 = ___

13. $\frac{3}{4}$ Of 12 = ___

14. $\frac{3}{5}$ of 20 = ___

15. $\frac{5}{6}$ of 24 = ___

You must get 13 correct to skip over this package

Activity

FRACTION is the word we use to denote a part of something. A fraction is written using 2 numbers, one above the other. The bottom number is the denominator and indicates how many equal parts the whole quantity is to be divided into. The top number is called athe numerator and indicates how many of the equal parts are being talked about.

Example 1: $\frac{1}{2}$ means that there are 2 equal parts and that we are considering 1 of them.

Then, $\frac{1}{2}$ of is dividing it into 2 equal parts and taking 1 of them.

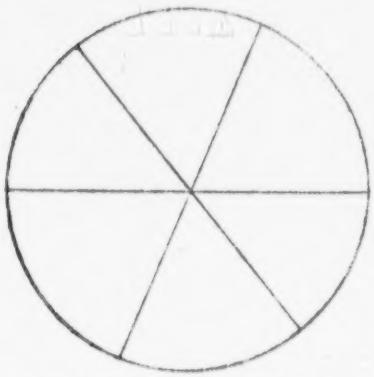
$\frac{1}{2}$ of 8 = 4 because 8 divided into 2 equal parts gives 4 in each part and one of the gives 4.

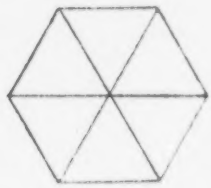
Example 2: $\frac{2}{3}$ means that there are 3 equal parts and we are considering 2 of them.

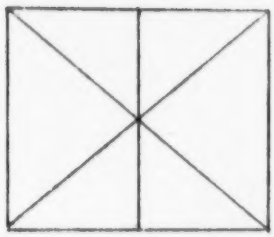
$\frac{2}{3}$ of is dividing it into 3 equal parts and taking 2 of them.

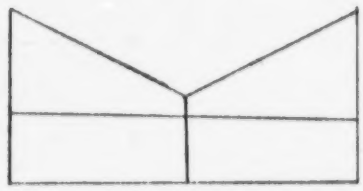
$\frac{2}{3}$ of 12 = 8 because 12 divided into 3 equal parts gives 4 in each part and 2 of them gives 8.

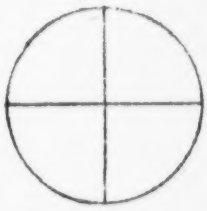
Use your pencil to shade one-half ($\frac{1}{2}$) of each of the figures

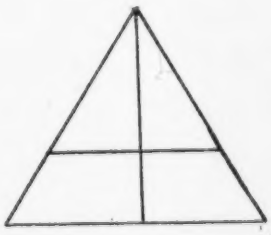












Draw a circle around half of each of the sets below.

1.

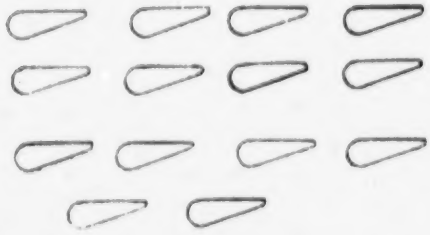
2.

5.

3.

4.

6.

7. 

8. X X X X X X X X X X X

X X X X X X X

Using the information that you obtained above, answer the following questions.

9. $\frac{1}{2}$ Of 4 =

10. $\frac{1}{2}$ of 6 =

11. $\frac{1}{2}$ of 8 =

12. $\frac{1}{2}$ of 10 =

13. $\frac{1}{2}$ of 2 =

14. $\frac{1}{2}$ of 12 =

15. $\frac{1}{2}$ of 14 =

16. $\frac{1}{2}$ of 18 =

ACTIVITY

1. $\frac{1}{2}$ of 20 =

2. $\frac{1}{2}$ of 10 =

3. $\frac{1}{3}$ of 30 =

4. $\frac{1}{4}$ of 16 =

5. $\frac{1}{5}$ of 20 =

6. $\frac{1}{6}$ of 24 =

7. $\frac{1}{7}$ of 14 =

8. $\frac{1}{8}$ of 16 =

9. $\frac{1}{9}$ of 18 =

10. $\frac{1}{10}$ of 100 =

11. $\frac{1}{11}$ of 22 =

12. $\frac{1}{12}$ of 12 =

13. $\frac{3}{12}$ of 12 =

14. $\frac{5}{12}$ of 12 =

15. $\frac{2}{3}$ of 30 =

16. $\frac{3}{4}$ of 16 =

17. $\frac{2}{5}$ of 20 =

18. $\frac{5}{6}$ of 24 =

19. $\frac{3}{7}$ of 14 =

20. $\frac{5}{8}$ of 16 =

21. $\frac{4}{9}$ of 18 =

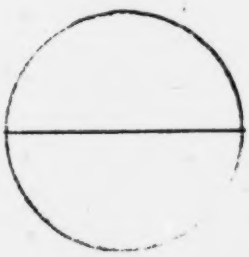
22. $\frac{3}{10}$ of 100 =

23. $\frac{4}{11}$ of 22 =

24. $\frac{7}{12}$ of 12 =

Activity

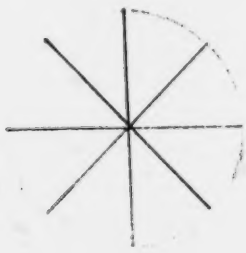
Shade in $\frac{1}{2}$ of this figure



Shade in $\frac{2}{4}$ of this figure

Shade in $\frac{3}{6}$ of this figure

Shade in $\frac{4}{8}$ of this figure

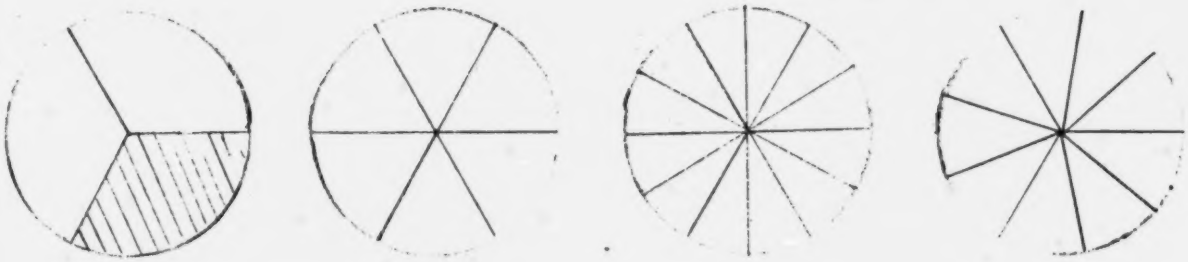


As you can see, the same amount of each figure has been shaded in. This means that $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, and $\frac{4}{8}$ are really the a same fraction but have different "names". Then, which one shall we use?

In giving an answer, we will agree to use $\frac{1}{2}$, because it is in"lowest terms", and the others are not.

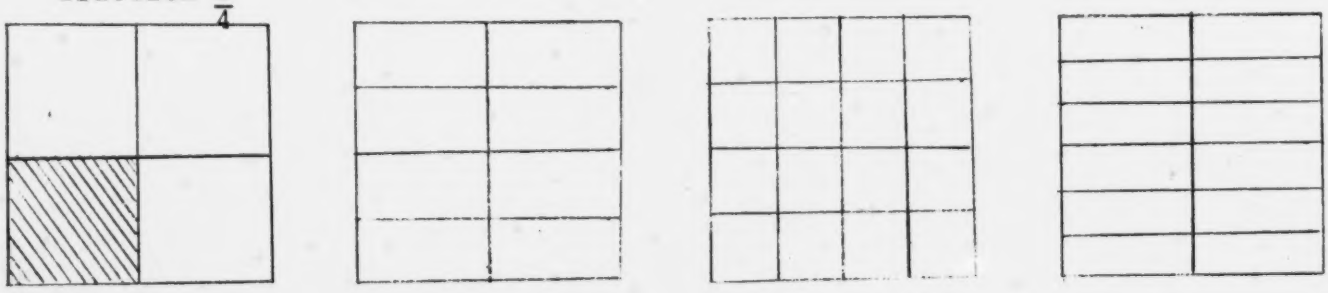
ACTIVITY

Use these figures to 3 other names for the lowest terms fraction $\frac{1}{3}$



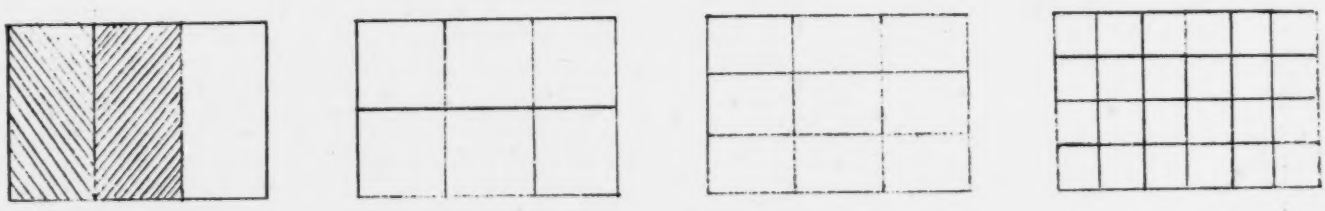
$\frac{1}{3}$ ____ ____ ____

Use these figures to find 3 other names for athe lowest terms fraction $\frac{1}{4}$



$\frac{1}{4}$ ____ ____ ____

Use these figures to find 3 other names for the lowest terms fraction $\frac{2}{3}$



$\frac{2}{3}$ ____ ____ ____

Activity

1. Give 6 fractions that are equal to each of the fractions below

$\frac{1}{2}$

$\frac{1}{3}$

$\frac{3}{4}$

$\frac{2}{5}$

$\frac{3}{7}$

$\frac{4}{5}$

$\frac{7}{16}$

ACTIVITY

Suppose you had a fraction like $\frac{4}{8}$, $\frac{3}{12}$, $\frac{5}{30}$, $\frac{54}{96}$ etc. and you wanted to know what the lowest terms fraction was without using a picture. Or, say you had a fraction and you didn't know if it was in lowest terms or not.

We can find the answer by reducing the fraction. There are two ways to reduce fractions. One is by division, and the other is by prime factorization.

Example 1: Reduce $\frac{4}{8}$ to lowest terms. Find the largest number that will divide into 8 and 4. The number is 4. 4 goes into 4 1 time, and 4 goes into 8 2 times, so $\frac{4}{8} = \frac{1}{2}$.

Example 1a; Reduce $\frac{4}{8}$ to lowest terms. The prime factorization of 4 = 2 x 2, and the prime factorization of 8 = 2 x 2 x 2. Now you already know that $\frac{2}{2} = 1$ so you get $\frac{1}{2}$ again.

$$\frac{4}{8} = \frac{\cancel{2}^{1} \times \cancel{2}^{1}}{\cancel{2}^{1} \times \cancel{2}^{1} \times 2} = \frac{1 \times 1}{1 \times 1 \times 2} = \frac{1}{2}$$

Example 2: Reduce $\frac{18}{24}$ to lowest terms. The largest number that will go into 18 and 24 is 6. 6 goes into 18 3 times and 6 goes into 24 4 times so $\frac{18}{24} = \frac{3}{4}$ in lowest terms

Example 2a: Reduce $\frac{18}{24}$ to lowest terms, by using prime factorization.

$$\frac{18}{24} = \frac{\overset{1}{\cancel{2}} \times 3 \times \overset{1}{\cancel{3}}}{\underset{1}{\cancel{2}} \times 2 \times 2 \times \underset{1}{\cancel{3}}} = \frac{3}{4}$$

Reduce each of these fractions showing both methods.

1. $\frac{7}{14}$

2. $\frac{8}{14}$

3. $\frac{50}{85}$

4. $\frac{12}{18}$

5. $\frac{18}{45}$

6. $\frac{40}{175}$

7. $\frac{36}{90}$

8. $\frac{34}{51}$

9. $\frac{21}{49}$

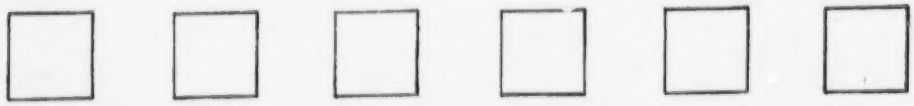
10. $\frac{22}{77}$

Reduce each fraction to lowest terms by the prime factorization method. Show all work.

1. $\frac{2}{4}$
2. $\frac{3}{6}$
3. $\frac{4}{4}$
4. $\frac{5}{15}$
5. $\frac{6}{10}$
6. $\frac{15}{20}$
7. $\frac{16}{20}$
8. $\frac{18}{27}$
9. $\frac{20}{24}$
10. $\frac{7}{21}$
11. $\frac{8}{18}$
12. $\frac{6}{14}$
13. $\frac{8}{30}$
14. $\frac{10}{50}$
15. $\frac{26}{39}$
16. $\frac{45}{72}$
17. $\frac{100}{345}$
18. $\frac{45}{70}$
19. $\frac{550}{700}$
20. $\frac{87}{117}$
21. $\frac{98}{147}$
22. $\frac{56}{1000}$
23. $\frac{63}{144}$
24. $\frac{90}{711}$

Shade in $2\frac{1}{2}$ of the circles below.

Shade in $3\frac{3}{4}$ of the squares below.



Shade in $1\frac{1}{3}$ of the circles below.

Shade in $2\frac{3}{4}$ of the circles below.

Shade in $4\frac{5}{6}$ of the hexagons below.

ACTIVITY

Change each improper fraction to a mixed number or a whole number.

1. $\frac{17}{5}$
2. $\frac{3}{2}$
3. $\frac{8}{3}$
4. $\frac{9}{4}$
5. $\frac{7}{2}$
6. $\frac{5}{2}$
7. $\frac{18}{9}$
8. $\frac{12}{5}$
9. $\frac{22}{3}$
10. $\frac{11}{3}$

Change each mixed number to an improper fraction.

11. $3\frac{1}{2}$
12. $4\frac{1}{4}$
13. $9\frac{1}{2}$
14. $1\frac{5}{8}$
15. $1\frac{2}{3}$
16. $7\frac{3}{4}$
17. $11\frac{1}{4}$
18. $12\ \frac{1}{2}$
19. $2\frac{3}{8}$
20. $8\frac{2}{3}$

S. I. C. S. PAK

SERIES: EXPLORATION

GRADE: 9

NUMBER: GM1-729

CLUSTER: CONSUMER AND HOMEMAKING EDUCATION
RELATED OCCUPATIONS

AREA: CONSUMERISM

TITLE: IT'S GOT A DOT

BY: H. BURTON TINGLE
SAHUARITA HIGH SCHOOL

DATE: MAY, 1972

RATIONALE

Since our money system is in decimals, and money is the basis for all our consumerism, it seems that knowledge of decimals is of maximum importance. Why, even your car's speedometer (Odometer) is calibrated in decimals.

Decimals will become even more important when the United States takes on the metric system of measurement.

In this package, you will be introduced to decimals.

BEHAVIORAL OBJECTIVES

1. Given any fraction, you should be able to write it as a decimal number with 90% accuracy.

2. Given any decimal number, you should be able to write it as a fraction in lowest terms with 90% accuracy.

PRE-TEST

1. Write $\frac{3}{10}$ as a decimal

2. Write $\frac{2}{100}$ as a decimal

3. Write $\frac{35}{100}$ as a decimal

4. Write $1\ \frac{5}{10}$ as a decimal

5. Write $2\frac{23}{1000}$ as a decimal

6. Write $14\ \frac{5}{1000}$ as a decimal

7. Write .5 as a fraction in lowest terms.

8. Write .063 as a fraction in lowest terms.

9. Write $\frac{1}{4}$ as a decimal

10. Write $\frac{3}{5}$ as a decimal

(you must get 9 correct to skip over this package)

INFORMATION SOURCES

1. Listen to the teacher presentation and/or
2. Read INTRODUCTION TO SECONDARY SCHOOL MATHEMATICS
   Volume 1, part II Unit 38, chapter 9

If you still have trouble or need extra practice, consult the following books.

A. INTRODUCTION TO SECONDARY SCHOOL MATHEMATICS p. 309-315

B. MAKING MATHEMATICS WORK p. 83-85

C. FUNDAMENTALS OF MATHEMATICS p. 125-129

ACTIVITY

We have special notation for fractions with denominators which are powers of 10. They are written with a dot called a decimal point. Numbers that are written this way are called decimal numbers-or just decimals.

Example 1: $\frac{2}{10}$ is written .2

Example 2: $\frac{23}{100}$ is written .23

Example 3: $\frac{471}{1000}$ is written .471

Example 4: $\frac{5}{100}$ is written .05

Write each of the following fractions as decimal numbers.

1. $\frac{5}{10}$
2. $\frac{7}{10}$
3. $14\frac{1}{10}$
4. $62\frac{14}{100}$
5. $4\frac{5}{100}$
6. $10\ \frac{6}{1,000}$
7. $5\frac{1}{100}$
8. $\frac{17}{1,000}$
9. $8\frac{9}{10}$
10. $3,426\ \frac{6}{10}$
11. $400\frac{4}{100}$
12. $60\frac{14}{100}$

ACTIVITY

Write these decimal numbers as fractions with denominators which are powers of 10.

1. .3
2. .03
3. .72
4. 7.2
5. $8.73¼
6. $2.6
7. .675
8. .004
9. 44.44
10. 888.888
11. 3,674.32
12. 67.7864

Write these decimal numbers as lowest term fractions.

13. .6
14. .45
15. .2
16. .8
17. .80
18. .800
19. .4
20. .40
21. .400
22. 4.5
23. 10.10
24. 7.65

ACTIVITY

Write these words as decimal numbers.

1. two-tenths
2. six and seven-tenths
3. nineteen and thirteen-hundredths
4. forty six and five-hundredths
5. four hundred twenty and nine-thousandths

Change these fractions to fractions with a denominator Of 10 or 100, then express it as a decimal.

1. $\frac{1}{2} = \frac{}{10} =$
2. $\frac{1}{5} = \frac{}{10} =$
3. $\frac{3}{5} = \frac{}{10} =$
4. $\frac{4}{5} = \frac{}{10} =$
5. $\frac{1}{4} = \frac{}{100} =$
6. $\frac{1}{25} = \frac{}{100} =$
7. $\frac{1}{20} = \frac{}{100} =$
8. $\frac{3}{4} = \frac{}{100} =$
9. $\frac{7}{20} = \frac{}{100} =$
10. $\frac{11}{20} = \frac{}{100} =$
11. $\frac{12}{20} = \frac{}{100} =$
12. $\frac{12}{25} = \frac{}{100} =$
13. $\frac{1}{50} = \frac{}{100} =$
14. $\frac{13}{50} = \frac{}{100} =$

RATIONALE

There are two main reasons why we need to factor polynomials: one is for finding the solutions to quadratic equations and the other is for reducing fractions with polynomials in the numerator and denominator.

As an algebraic process, factoring is very important as it is used in a lot of advanced math courses.

BEHAVIORAL OBJECTIVES

1. Given any positive whole number, you should be able to give its prime factorization with 100% accuracy.
2. Given any set of polynomials in which each term has a common factor, you should be able to factor out that largest common factor with 90% accuracy.
3. Given any set of polynomials which are represented as the difference of 2 squares, you should be able to factor them with 90% accuracy.
4. Given any set of polynomials which are perfect square trinomials, you should be able to factor them with 90% accuracy.
5. Given any set of polynomials which factor as the product of 2 binomials, you should be able to find those factors with 80% accuracy.

PRE_EVALUATION

1. Give the prime factorization of 90.

2. Give the prime factorization of 100.

3. Factor: $x^2 + 2x$

4. Factor: $5x + 15x^3$

5. Factor: $x^2 - 4$

6. Factor: $a^4 - b^8$

7. Factor: $x^2 + 6x + 8$

8. Factor: $x^2 + 6x + 9$

9. Factor: $x^2 - 10x - 24$

10. Factor: $(x + 2)a^2 - 4(x + 2)$

You must get 9 correct to skip over this package

INFORMATION SOURCES

1. Listen to the Teacher Presentation.
2. Read Chapter 7 in the Textbook.

ACTIVITY

Give the prime factorization of each of these numbers.

1. 10
2. 20
3. 30
4. 40
5. 50
6. 60
7. 70
8. 80
9. 500
10. 600
11. 640
12. 550
13. 630
14. 910
15. 4,450

Activity

Factor these polynomials by factoring out the largest common monomial factor.

1. $2x + 4$
2. $4x + 2$
3. $6x^2 + 12$
4. $5x + 20$
5. $11 + 33x$
6. $9a^2 + 28a$
7. $6x^2 + 5x$
8. $x^2 + 2x^3$
9. $4x^2 + 3x$
10. $3a^3 + 5a^5$
11. $4x^2 + 8x$
12. $9a^3 + 3a^4$
13. $6z^2 + 12z^3$
14. $2x + 4 + 6x^2$
15. $3x^3 + 6x^2 - 9x$
16. $4x^4 + 8x^3 - 12x^2$
17. $6x^3 + 3x^4 + 3x^5$
18. $7x + 14x^5 - 7x^4$
19. $x^4 + x^6 + x$
20. $3x^3 + 4x^5 + 6x^7$
21. $8x^4 + 24x + 4x^6$
22. $9x^2 + 18x^4 + 6x^3$
23. $z^2x^2 + zx + 3z^3x$
24. $5x^3 - 3x + 9x^2 - x^5$
25. $4x^3 + 16x^2 - 8x^8 + 12x$
26. $5x^{10} + 20x^3 + 45x^5 - 15x^7$

ACTIVITY

Factor these differences of squares completely

1. $x^2 - 1$
2. $x^2 - 4$
3. $x^2 - 9$
4. $x^2 - 16$
5. $x^2 - 25$
6. $x^2 - 36$
7. $x^2 - 49$
8. $x^2 - 81$
9. $x^2 - 144$
10. $x^2 - 121$
11. $x^2 - 400$
12. $x^2 - 256$
13. $a^2 - b^2$
14. $a^4 - c^2$
15. $a^4 - x^6$
16. $x^6 - 25$
17. $x^4 - a^{10}$
18. $c^8 - 4$
19. $m^4 - 25n^2$
20. $4x^2 - 9z^2$
21. $(x + 2)^2 - 16$
22. $(x + 3)^2 - s^2$
23. $(x - a + b)^2 - 64$
24. $(x + b)^2 - (c + 2)^2$

ACTIVITY

Factor these perfect square trinomials completely.

1. $x^2 + 2x + 1$
2. $x^2 + 4x + 4$
3. $x^2 + 6x + 9$
4. $x^2 + 8x + 16$
5. $x^2 + 10x + 25$
6. $x^2 + 12x + 36$
7. $x^2 + 14x + 49$
8. $x^2 + 16x + 64$
9. $x^2 + 18x + 81$
10. $x^2 + 20x + 100$
11. $x^2 + 22x + 121$
12. $x^2 + 24x + 144$
13. $x^2 + 2xy + y^2$
14. $x^2 + 6xb + 9b^2$
15. $16x^2 + 24x + 9$
16. $4x^2 - 12x + 9$
17. $9x^2 - 12x + 4$
18. $25x^2 + 20x + 4$
19. $36x^2 - 60x + 25$
20. $49x^2 + 14x + 1$
21. $64a^2 + 48a + 9$
22. $121x^2 - 44x + 4$
23. $100x^2 + 60xy + 9y^2$
24. $169x^2 + 286xy + 121y^2$

Name_____

Factor these differences of squares

1. $\frac{1}{4} - a^{14}$
2. $a^{20} - 36$
3. $\frac{1}{9} - a^2$
4. $.25 - 4x^2$
5. $9x^4 - 4y^2$
6. $4y^2 - 9x^4$
7. $25x^4 - 81t^2$
8. $16x^2 - 9t^6$
9. $49x^6 - 64$
10. $a^4 - b^4$
11. $b^4 - 81$
12. $16b^4 - 81t^4$

Factor these perfect square trinomials

13. $x^2 + 18x + 81$
14. $x^2 - 16x + 64$
15. $x^2 - 22x + 121$
16. $x^2 - 24x + 144$
17. $x^2 - 26x + 169$
18. $4a^2 + 12a + 9$
19. $9x^2 - 24x + 16$
20. $4a^2 + 8ab + 4b^2$
21. $\frac{1}{4} - 4a^2 + 4$
22. $16a^4 - 8a^2 + 1$
23. $25a^2 - 100a + 100$
24. $36x^4 - 24x^2 + 4$

Factor these polynomials

25. $2x + 4x^2$
26. $x + 2x$
27. $9a^2 + 18ab$
28. $m^2n + n^2m$
29. $rst + st^2$
30. $3rt + 6rt^2$
31. $ab + 3a$
32. $6a^2 + 18ab + 4b^2$
33. $12ab + 16ab^2 + 20abc$
34. $5s^2t - 10st^2 + 5s^2t^2$

ACTIVITY

In each of the problems below, find the 2 numbers whose product is the number in column A and whose sum is the number in column B.

	A	B
1.	10	7
2.	12	7
3.	15	8
4.	16	10
5.	24	14
6.	24	-11
7.	24	10
8.	12	8
9.	14	-9
10.	6	5
11.	5	-6
12.	4	-5
13.	-8	2
14.	-8	-2
15.	-10	3
16.	-12	1
17.	-15	-2
18.	-20	-1
19.	-7	6
20.	-2	-1
21.	-5	-4
22.	-30	-1
23.	-35	2
24.	-40	-3

ACTIVITY

Factor these polynomials into a product of two binomials.

1. $x^2 + 7x + 10$
2. $x^2 + 7x + 12$
3. $x^2 + 8x + 15$
4. $x^2 + 10x + 16$
5. $x^2 + 14x + 24$
6. $x^2 - 11x + 24$
7. $x^2 + 10x + 24$
8. $x^2 + 8x + 12$
9. $x^2 - 9x + 14$
10. $x^2 + 5x + 6$
11. $x^2 - 6x + 5$
12. $x^2 - 5x + 4$
13. $x^2 + 2x - 8$
14. $x^2 - 2x - 8$
15. $x^2 + 3x - 10$
16. $x^2 + x - 12$
17. $x^2 - 2x - 15$
18. $x^2 - x - 20$
19. $x^2 + 6x - 7$
20. $x^2 - x - 2$
21. $x^2 - 4x - 5$
22. $x^2 - x - 30$
23. $x^2 + 2x - 35$
24. $x^2 - 3x - 40$

ACTIVITY

Factor each of these polynomials completely

1. $x^2 - 10x - 24$

2. $x^3 + 4x^2 - 21x$

3. $x^4 - 16$

4. $x^8 - 16$

5. $(x^2 - y^2)x^2 + 2x(x^2 - y^2) + 1(x^2 - y^2)$

6. $(x^2 - 1)(x^2) - (x^2 - 1)$

7. $(x^2 + 3x + 2)(x^2) - 4(x^2 + 3x + 2)$

8. $5a^2 + 6a^3 + a^4$

9. $(a^2 + 1)\ a\ + (a^2 + 1) - 2$

10. $(m^2 - n^2)(2) + 1(m^2 - n^2)$

RATIONALE

So far, we have solved linear or first degree equations. If the variable is squared, it becomes a second degree equation. Many times problems appear with the variable squared. This means, according to the fundamental theorem of algebra, that it has 2 solutions. Finding those 2 solutions is the work of this package.

BEHAVIORAL OBJECTIVES

1. Given any quadratic equation with rational coefficients, you should be able to find the solutions with 80% accuracy.

Pre-Evaluation

Find the solutions to each of these quadratic equations.

1. $x^2 - 9 = 0$

2. $x^2 - 4 = 0$

3. $x^2 + 6x + 9 = 0$

4. $x^2 + 2x + 1 = 0$

5. $x^2 - 4x - 5 = 0$

6. $x^2 + 2x - 15 = 0$

7. $2x^2 + x - 6 = 0$

8. $2x^2 + 5x - 1 = 0$

9. $4x^2 = 2x + 3$

10. $\frac{3x^2}{2} + 4x = .3$

You must get 9 correct to skip over this package.

11

INFORMATION SOURCES

1. Listen to the Teacher Presentation.
2. Read Chapter 13 in the Textbook.

III

Find the solutions to these quadratic equations by factoring.

1. $x^2 - 16 = 0$
2. $x^2 - 25 = 0$
3. $2x^2 - 2 = 0$
4. $x^2 - 64 = 0$
5. $x^2 - 81 = 0$
6. $3x^2 - 300 = 0$
7. $x^2 = 36$
8. $x^2 + 4x + 4 = 0$
9. $x^2 + 10x + 25 = 0$
10. $x^2 - 12x - 36 = 0$
11. $x^2 - 20x + 100 = 0$
12. $x^2 + 18x = -81$
13. $x^2 + 16x + 64 = 0$
14. $x^2 + 24x + 144 = 0$
15. $4x^2 - 9 = 0$
16. $9x^2 = 1$
17. $9x^2 - 4 = 0$
18. $16x^2 - 9 = 0$
19. $25x^2 = 4$
20. $16x^2 - 25 = 0$
21. $81x^2 = 1$
22. $4x^2 + 12x + 9 = 0$
23. $9x^2 - 30x + 25 = 0$
24. $16x^2 - 8x + 1 = 0$
25. $25x^2 + 20x + 4 = 0$
26. $25x^2 + 60x + 36 = 0$
27. $9x^2 - 12x + 4 = 0$
28. $4x^2 + 40x + 100 = 0$

IV

Find the solutions to these quadratic equations by factoring. Show all work.

1. $x^2 - 7x + 12 = 0$

2. $x^2 - 8x + 15 = 0$

3. $x^2 - 11x + 24 = 0$

4. $x^2 - 10x + 16 = 0$

5. $x^2 - 8x + 12 = 0$

6. $x^2 - 5x = -4$

7. $x^2 - 6x + 8 = 0$

8. $2x^2 - 15x + 18 = 0$

9. $3x^2 - 11x = -10$

10. $4x^2 - 8x + 3 = 0$

11. $x^2 + 8x + 12 = 0$

12. $x^2 + 7x + 10 = 0$

13. $x^2 + 5x + 4 = 0$

14. $x^2 + 11x = -18$

15. $x^2 + 5x + 6 = 0$

16. $x^2 + 9x + 20 = 0$

17. $x^2 + 10x + 24 = 0$

18. $x^2 + 14x + 24 = 0$

19. $2x^2 + 7x + 6 = 0$

20. $5x^2 + 8x + 3 = 0$

21. $x^2 + 2x - 15 = 0$

22. $x^2 - 3x - 10 = 0$

23. $x^2 - 7x - 18 = 0$

24. $x^2 - 5x - 24 = 0$

25. $2x^2 - x - 6 = 0$

26. $3x^2 + 5x - 12 = 0$

Find the solutions to these quadratic equations by completing the square. Show all work.

1. $x^2 + 6x = -7$

2. $x^2 + 8x = -7$

3. $x^2 - 2x = 3$

4. $x^2 + 4x = 5$

5. $x^2 + 10x = -9$

6. $x^2 - 12x = 13$

7. $x^2 + 3x = 2$

8. $x^2 - 5x = 2\frac{3}{4}$

9. $x^2 + x = \frac{3}{4}$

10. $x^2 + 7x = \frac{15}{4}$

11. $x^2 + 4x = 6$

12. $x^2 + 6x = 10$

13. $x^2 + 2x = 0$

14. $x^2 + 8x = 14$

VI

15. $x^2 + 12x + 12 = 0$

16. $x^2 - 10x + 2 = 0$

17. $x^2 + 2x - 2 = 0$

18. $x^2 + 6x - 11 = 0$

19. $x^2 - 5x + 1 = 0$

20. $x^2 - 3x - 2 = 0$

Solve these quadratic equations by completing the square. Show all work.

1. $2x^2 + 4x - 10 = 0$

2. $3x^2 - 6x - 18 = 0$

3. $2x^2 + 8x - 10 = 0$

4. $4x^2 + 8x - 4 = 0$

5. $3x^2 - 9x - 12 = 0$

6. $5x^2 - 15x = 20$

7. $5x^2 - 10x - 6 = 0$

8. $2x^2 - 6x - 7 = 0$

9. $3x^2 - 12x = 1$

10. $2x^2 - 2x = 5$

11. $6x^2 - 12x = 1$

12. $10x^2 + 30x = 5$

VIII

13. $2x^2 + 3x = 2$

14. $3x^2 - 4x = 1$

15. $5x^2 - x - 2 = 0$

16. $4x^2 - 6x - 6 = 0$

17. $7x^2 - 8x = 14$

18. $2x^2 - 17x + 1 = 0$

XIIII

Solve these equations by the quadratic formula. Show all work and leave answers in simplest possible terms.

1. $x^2 + 4x + 4 = 0$

2. $x^2 - 12x - 36 = 0$

3. $x^2 + 10x + 25 = 0$

4. $x^2 - 20x + 100 = 0$

5. $4x^2 + 12x + 9 = 0$

6. $x^2 - 11x + 24 = 0$

7. $x^2 - 7x + 12 = 0$

8. $x^2 - 5x = -4$

9. $x^2 - 10x + 16 = 0$

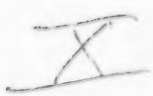
10. $2x^2 - 15x = -18$

11. $4x^2 - 8x + 3 = 0$

12. $x^2 + 7x + 10 = 0$

13. $x^2 + 5x + 4 = 0$

14. $x^2 + 11x = -18$



15. $x^2 + 5x + 6 = 0$

16. $x^2 + 9x + 20 = 0$

17. $x^2 + 10x + 24 = 0$

18. $x^2 + 2x - 15 = 0$

19. $x^2 - 7x - 18 = 0$

20. $x^2 - 3x - 10 = 0$

21. $2x^2 - x - 6 = 0$

22. $3x^2 + 5x = 12$

23. $x^2 - 5x = 24$

24. $x^2 - 4x - 12 = 0$

25. $3x^2 - 11x = -10$

26. $5x^2 - x = 2$

27. $2x^2 - 6x - 7 = 0$

28. $2x^2 + 3x - 2 = 0$

29. $3x^2 + 5x - 1 = 0$

30. $4x^2 - 7x - 4 = 0$

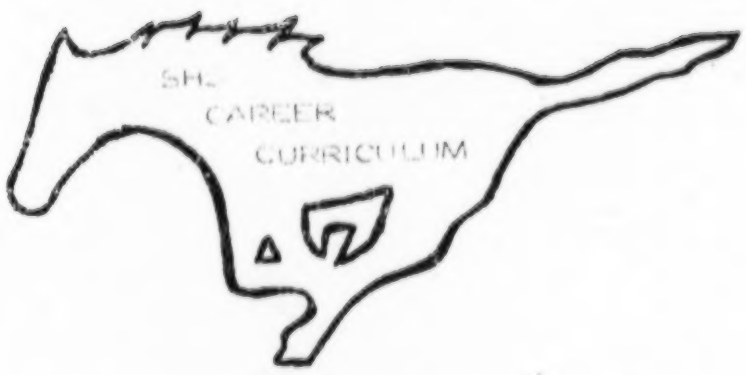
XL

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: WE GOTTA SPLIT UP

by

H. Burton Tingle

RATIONALE

There are two main reasons why we need to factor polynomials: one is for finding the solutions to quadratic equations and the other is for reducing fractions with polynomials in the numerator and denominator.

As an algebraic process, factoring is very important as it is used in a lot of advanced math courses.

BEHAVIORAL OBJECTIVES

1. Given any positive whole number, you should be able to give its prime factorization with 100% accuracy.
2. Given any set of polynomials in which each term has a common factor, you should be able to factor out that largest common factor with 90% accuracy.
3. Given any set of polynomials which are represented as the difference of 2 squares, you should be able to factor them with 90% accuracy.
4. Given any set of polynomials which are perfect square trinomials, you should be able to factor them with 90% accuracy.
5. Given any set of polynomials which factor as the product of 2 binomials, you should be able to find those factors with 80% accuracy.

PRE_EVALUATION

1. Give the prime factorization of 90.

2. Give the prime factorization of 100.

3. Factor: $x^2 + 2x$

4. Factor: $5x + 15x^3$

5. Factor: $x^2 - 4$

6. Factor: $a^4 - b^8$

7. Factor: $x^2 + 6x + 8$

8. Factor: $x^2 + 6x + 9$

9. Factor: $x^2 - 10x - 24$

10. Factor: $(x + 2)a^2 - 4(x + 2)$

You must get 9 correct to skip over this package

INFORMATION SOURCES

1. Listen to the Teacher Presentation.
2. Read Chapter 7 in the Textbook.

ACTIVITY

Give the prime factorization of each of these numbers.

1. 10
2. 20
3. 30
4. 40
5. 50
6. 60
7. 70
8. 80
9. 500
10. 600
11. 640
12. 550
13. 630
14. 910
15. 4,450

Activity

Factor these polynomials by factoring out the largest common monomial factor.

1. $2x + 4$
2. $4x + 2$
3. $6x^2 + 12$
4. $5x + 20$
5. $11 + 33x$
6. $9a^2 + 28a$
7. $6x^2 + 5x$
8. $x^2 + 2x^3$
9. $4x^2 + 3x$
10. $3a^3 + 5a^5$
11. $4x^2 + 8x$
12. $9a^3 + 3a^4$
13. $6z^2 + 12z^3$
14. $2x + 4 + 6x^2$
15. $3x^3 + 6x^2 - 9x$
16. $4x^4 + 8x^3 - 12x^2$
17. $6x^3 + 3x^4 + 3x^5$
18. $7x + 14x^5 - 7x^4$
19. $x^4 + x^6 + x$
20. $3x^3 + 4x^5 + 6x^7$
21. $8x^4 + 24x + 4x^6$
22. $9x^2 + 18x^4 + 6x^3$
23. $z^2x^2 + zx + 3z^3x$
24. $5x^3 - 3x + 9x^2 - x^5$
25. $4x^3 + 16x^2 - 8x^8 + 12x$
26. $5x^{10} + 20x^3 + 45x^5 - 15x^7$

ACTIVITY

Factor these differences of squares completely

1. $x^2 - 1$
2. $x^2 - 4$
3. $x^2 - 9$
4. $x^2 - 16$
5. $x^2 - 25$
6. $x^2 - 36$
7. $x^2 - 49$
8. $x^2 - 81$
9. $x^2 - 144$
10. $x^2 - 121$
11. $x^2 - 400$
12. $x^2 - 256$
13. $a^2 - b^2$
14. $a^4 - c^2$
15. $a^4 - x^6$
16. $x^6 - 25$
17. $x^4 - a^{10}$
18. $c^8 - 4$
19. $m^4 - 25n^2$
20. $4x^2 - 9z^2$
21. $(x + 2)^2 - 16$
22. $(x + 3)^2 - s^2$
23. $(x - a + b)^2 - 64$
24. $(x + b)^2 - (c + 2)^2$

ACTIVITY

Factor these perfect square trinomials completely.

1. $x^2 + 2x + 1$
2. $x^2 + 4x + 4$
3. $x^2 + 6x + 9$
4. $x^2 + 8x + 16$
5. $x^2 + 10x + 25$
6. $x^2 + 12x + 36$
7. $x^2 + 14x + 49$
8. $x^2 + 16x + 64$
9. $x^2 + 18x + 81$
10. $x^2 + 20x + 100$
11. $x^2 + 22x + 121$
12. $x^2 + 24x + 144$
13. $x^2 + 2xy + y^2$
14. $x^2 + 6xb + 9b^2$
15. $16x^2 + 24x + 9$
16. $4x^2 - 12x + 9$
17. $9x^2 - 12x + 4$
18. $25x^2 + 20x + 4$
19. $36x^2 - 60x + 25$
20. $49x^2 + 14x + 1$
21. $64a^2 + 48a + 9$
22. $121x^2 - 44x + 4$
23. $100x^2 + 60xy + 9y^2$
24. $169x^2 + 286xy + 121y^2$

Name _____

Factor these differences of squares

1. $\frac{1}{4} - a^{14}$
2. $a^{20} - 36$
3. $\frac{1}{9} - a^2$
4. $.25 - 4x^2$
5. $9x^4 - 4y^2$
6. $4y^2 - 9x^4$
7. $25x^4 - 81t^2$
8. $16x^2 - 9t^6$
9. $49x^6 - 64$
10. $a^4 - b^4$
11. $b^4 - 81$
12. $16b^4 - 81t^4$

Factor these perfect square trinomials

13. $x^2 + 18x + 81$
14. $x^2 - 16x + 64$
15. $x^2 - 22x + 121$
16. $x^2 - 24x + 144$
17. $x^2 - 26x + 169$
18. $4a^2 + 12a + 9$
19. $9x^2 - 24x + 16$
20. $4a^2 + 8ab + 4b^2$
21. $\frac{4}{a} - 4a^2 + 4$
22. $16a^4 - 8a^2 + 1$
23. $25a^2 - 100a + 100$
24. $36x^4 - 24x^2 + 4$

Factor these polynomials

25. $2x + 4x^2$
26. $x + 2x$
27. $9a^2 + 18ab$
28. $m^2n + n^2m$
29. $rst + st^2$
30. $3rt + 6rt^2$
31. $ab + 3a$
32. $6a^2 + 18ab + 4b^2$
33. $12ab + 16ab^2 + 20abc$
34. $5s^2t - 10st^2 + 5s^2t^2$

ACTIVITY

In each of the problems below, find the 2 numbers whose product is the number in column A and whose sum is the number in column B.

	A	B
1.	10	7
2.	12	7
3.	15	8
4.	16	10
5.	24	14
6.	24	-11
7.	24	10
8.	12	8
9.	14	-9
10.	6	5
11.	5	-6
12.	4	-5
13.	-8	2
14.	-8	-2
15.	-10	3
16.	-12	1
17.	-15	-2
18.	-20	-1
19.	-7	6
20.	-2	-1
21.	-5	-4
22.	-30	-1
23.	-35	2
24.	-40	-3

ACTIVITY

Factor these polynomials into a product of two binomials.

1. $x^2 + 7x + 10$
2. $x^2 + 7x + 12$
3. $x^2 + 8x + 15$
4. $x^2 + 10x + 16$
5. $x^2 + 14x + 24$
6. $x^2 - 11x + 24$
7. $x^2 + 10x + 24$
8. $x^2 + 8x + 12$
9. $x^2 - 9x + 14$
10. $x^2 + 5x + 6$
11. $x^2 - 6x + 5$
12. $x^2 - 5x + 4$
13. $x^2 + 2x - 8$
14. $x^2 - 2x - 8$
15. $x^2 + 3x - 10$
16. $x^2 + x - 12$
17. $x^2 - 2x - 15$
18. $x^2 - x - 20$
19. $x^2 + 6x - 7$
20. $x^2 - x - 2$
21. $x^2 - 4x - 5$
22. $x^2 - x - 30$
23. $x^2 + 2x - 35$
24. $x^2 - 3x - 40$

ACTIVITY

Factor each of these polynomials completely

1. $x^2 - 10x - 24$

2. $x^3 + 4x^2 - 21x$

3. $x^4 - 16$

4. $x^8 - 16$

5. $(x^2 - y^2)x^2 + 2x(x^2 - y^2) + 1(x^2 - y^2)$

6. $(x^2 - 1)(x^2) - (x^2 - 1)$

7. $(x^2 + 3x + 2)(x^2) - 4(x^2 + 3x + 2)$

8. $5a^2 + 6a^3 + a^4$

9. $(a^2 + 1)\ a\ + (a^2 + 1) - 2$

10. $(m^2 - n^2)(2) + 1(m^2 - n^2)$

ACTIVITY

read p. 271

1. What is a county agent?

2. What kind of work do they do?

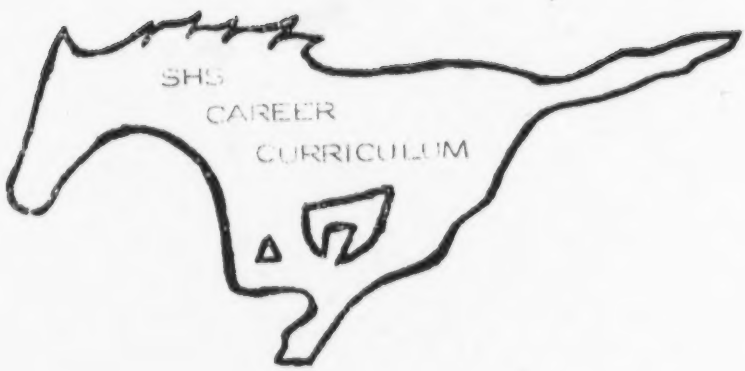
3. In years to come, will we need more or fewer county agents? Why?

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: HE'S IN THERE SOMEPLACE

BY

H. Burton Tingle

RATIONALE

Of all the topics in algebra, solution of equations is the most important. As a matter of fact, algebra is the solution of equations. The solution of equations has many practical uses and the better you know it, the more you can use it.

BEHAVIORAL OBJECTIVES

1. Given any set of equations with only 1 variable and that variable in the first degree only; and all numbers being rational, you should be able to find the solutions with 80% accuracy.

Pre-Evaluation

Solve for the unknown variable

1. $x + 2 = 3$

2. $x - 18 = 19$

3. $5x = 60$

4. $\frac{x}{6} = 36$

5. $2x + 7 = 31$

6. $\frac{x}{2} - 11 = 46$

7. $3x - 7 + x = 11 - 4x$

8. $6x + \frac{2}{3} + 11 = 0 - \frac{5x}{3} + 1$

9. $12.1x - \frac{3}{4} + \frac{5}{3} = \frac{2x}{3} - .6 + .2x$

10. $30 - x + 1.7 - \frac{2x}{5} = 14.2 - 3\frac{1}{2} + .9x$

You must get 9 correct to skip over this package.

INFORMATION SOURCES

1. Look at the filmstrip presentation on solution of linear equations

2. Read chapter 3 in the textbook

SE-9 Name _____

Solve each equation. Show every step, and check your work.

1. $x + 7 = 9$

2. $x + 6 = 19$

3. $d + 4 = 54$

4. $x + 3 = 27$

5. $s + 3 = 3$

6. $z + 67 = 108$

7. $88 + x = 467$

8. $y + 567 = 679$

9. $t + 3.4 = 7.8$

10. $x + 4.56 = 8.97$

11. $f + 3.006 = 5.002$

12. $x + 13.56 = 56$

13. $x + 7 = 5$

14. $x + 5 = 1$

15. $x + 11 = 7$

16. $x + 78 = 75$

17. $x + 108 = 100$

18. $x + 354 = 187$

19. $s + 2{,}340 = 200$

20. $567 + a = 342$

21. $x + 4.56 = 3.54$

22. $v + 3.761 = 3$

23. $x + 5 = 4.607$

24. $x + \frac{3}{4} = \frac{1}{2}$

SE-10 Name _____

Solve each equation. Show all work and check your work.

1. $x - 9 = 10$

2. $x - 10 = 3$

3. $x - 7 = 8$

4. $d - 7 = 3$

5. $a - .3 = 5$

6. $x - 45 = 19$

7. $w - 34 = 34$

8. $s - 345 = 190$

9. $x - 178 = 3$

10. $x - 4 = 879$

11. $x - 2{,}345 = 10$

12. $x - .98 = 1.2$

13. $x - 4.56 = 7.07$

14. $c - 4.5 = 5.4$

15. $z - 4 = -4$

16. $x - 3 = -5$

17. $x - 5 = -8$

18. $x - 11 = -3$

19. $x - 5 = -7$

20. $x - 10 = -8$

21. $x - 3.2 = -2.3$

22. $x - 3.405 = -.007$

23. $x = -3.4 + 4.1$

24. $x - \frac{2}{3} = \frac{5}{7}$

SE-11 Name _____

Solve each equation. Show all work and check your answers.

1. $3x = 15$

2. $5x = 60$

3. $4x = 56$

4. $7x = 91$

5. $6x = 48$

6. $7x = 28$

7. $3x = 111$

8. $9x = 216$

9. $10x = 340$

10. $12x = 1728$

11. $80x = 4000$

12. $60x = 780$

13. $4x = -16$

14. $5x = -70$

15. $-3x = 45$

16. $-2x = -46$

17. $5x = -480$

18. $-x = -5$

19. $-3.1x = -9.3$

20. $-.09x = 1.008$

21. $.6x = .00246$

22. $8x = 1.032$

23. $-4.2x = 34.4786$

24. $4.3x = -.00172$

SE-12 Name _____

Solve for the unknown variable. Show all work and check your answers.

1. $\frac{x}{5} = 4$

2. $\frac{x}{7} = 5$

3. $\frac{b}{7} = 7$

4. $\frac{x}{7} = 12$

5. $\frac{x}{5} = 11$

6. $\frac{x}{2} = 98$

7. $\frac{x}{7} = 66$

8. $\frac{x}{3} = 88$

9. $\frac{z}{7} = 33$

10. $\frac{a}{8} = 786$

11. $\frac{x}{5} = 11$

12. $\frac{s}{5} = 2.00$

13. $\frac{s}{14} = 8$

14. $\frac{a}{.8} = 8.1$

15. $\frac{x}{7} = \frac{4}{3}$

16. $\frac{x}{\frac{1}{2}} = \frac{5}{6}$

17. $\frac{x}{3} = -2$

18. $\frac{x}{-2} = -6$

19. $\frac{x}{5} = -7$

20. $\frac{w}{7} = -8$

21. $\frac{t}{-6} = -16$

22. $\frac{x}{-4} = -20$

23. $\frac{x}{-3} = -67$

24. $\frac{f}{43} = -567$

25. $\frac{x}{1} = -4$

26. $\frac{x}{-1} = -907$

27. $\frac{y}{-3} = 56$

28. $\frac{x}{17} = -4305$

29. $\frac{x}{-2} = -791$

30. $\frac{d}{.8} = -57.789$

31. $\frac{x}{1.2} = -3098.11$

32. $\frac{x}{.07} = -.0098$

SE-2 Name _____

When we combine the four operations as shown on the preceeding page, or use any of them to manipulate an equation with variables in a special way, we are solving the equation. When the number has been found, it can be checked by putting it back into the original equation in place of the variable.

Example 1:

$3x + 2 = 17$

$3x + 2 - 2 = 17 - 2$ (Subtracting 2 from both sides)

$3x = 15$ (Simplifying)

$\frac{3x}{3} = \frac{15}{3}$ (Dividing both sides by 3)

$x = 5$ (Simplifying)

$3(5) + 2 = 17$

$15 + 2 = 17$ (Check)

$17 = 17$

Solve these equations and check each one. Show every step.

1. $2x + 3 = 15$ Check

2. $5x + 10 = 50$

3. $\frac{x}{2} + 7 = 18$

4. $\frac{x}{3} - 2 = 4$

5. $3x + \frac{1}{3} = 6$ Check

6. $\frac{2x}{3} + 3 = 4$

7. $\frac{3x}{2} - 4 = 1$

8. $\frac{3x}{4} + \frac{4}{3} = \frac{1}{6}$

SE-3 Name _____

Below are several equations to which solutions are given. Check each one to see if the given solution is correct.

1. $x + 5 = 8$; $x = 2$ ____
2. $7x = 40$; $x = 5\frac{2}{7}$ ____
3. $5 - x = 2$; $x = 2$ ____
4. $3x - 2 = 10$; $x = 5$ ____
5. $4x + 3 = 23$; $x = 20$ ____
6. $6x - 2 = 22$; $x = 4$ ____
7. $7x + 3 = 45$; $x = 6$ ____
8. $10x - 8 = 92$; $x = 100$ ____

Solve each equation and check. Show every step

9. $4x + 3 = 31$

10. $7x + 5 = 19$

11. $3x + 13 = 28$

12. $2x - 10 = 8$

13. $8x - 21 = 299$

14. $\frac{x}{2} + 3 = 8$

15. $\frac{x}{3} + 7 = 11$

16. $\frac{x}{4} + 8 = 8$

17. $\frac{x}{7} - 4 = 0$

18. $\frac{x}{19} - 57 = 134$

SE-13 Name

Solve each equation. Show all work and check your answers.

1. $3x + 3 = 27$

2. $5x + 4 = 54$

3. $4x + 5 = 1$

4. $7x - 3 = 5$

5. $6x - 7 = 3$

6. $\frac{x}{8} - 45 = 19$

7. $\frac{x}{7} - 3.2 = -2.3$

8. $\frac{x}{5} - 10 = -8$

9. $\frac{s}{5} + 3.4 = 7.8$

10. $\frac{x}{\frac{1}{2}} + 6 = 19$

SE-14 Name

Solve each equation. Show all work and check your answers.

1. $x + x = 6$

2. $2x + x = 6$

3. $5x + 2x = 21$

4. $4x + 4x = 24$

5. $3x + 2x = 25$

6. $4x + 2x = 60$

7. $7x + 3x = 70$

8. $6x + 6x = 96$

9. $5x - 2x = 18$

10. $6x - 5x = 17$

11. $3x - x = 10$

12. $89x - 9x = 1.60$

13. $5.6x - .6x = .02$

14. $45x - 40x = 1.0025$

15. $6.8x - 5.7x = .121$

16. $7x - 9x = 28$

SE-15 Name

1. Solve each equation. Show all work and check your answers.

1. $x = 6 - x$

2. $2x = 6 - x$

3. $5x = 21 - 2x$

4. $4x = 24 - 4x$

5. $3x = 25 - 2x$

6. $4x = 60 - 2x$

7. $7x = 70 - 3x$

8. $6x = 96 - 6x$

9. $5x = 18 + 2x$

10. $6x = 17 + 5x$

11. $3x = 10 + x$

12. $89x = 1.60 + 9x$

13. $5.6x = .02 + .6x$

14. $45x = 1.0025 + 40x$

15. $6.8x = .121 + 5.7x$

16. $7x = 28 + 9x$

Name _____

Find the numeral which makes each open sentence true. Show every step and check your work.

1. $x - 12 = 23$

2. $x + 17 = 30$

3. $k + \frac{1}{2} = 5$

4. $\frac{m}{3} = 51$

5. $\frac{1}{x} = \frac{2}{3}$

6. $2x + 3 = x + 8$

7. $3x + 7 = 19$

8. $x - 7\frac{1}{2} = 7$

9. $12 + 3 = x - 3$

10. $\frac{3x}{4} + 2 = \frac{11}{2}$

11. $3x + 7 = x + 11$

12. $\frac{1}{2} + x - 1 = \frac{7}{4}$

SE-16 Name

Solve each equation. Show all work and check your answers. Give each answer in lowest terms.

1. $\frac{2x}{3} = 8$

2. $\frac{5x}{6} = 10$

3. $\frac{4x}{3} = 20$

4. $\frac{3x}{5} = 9$

5. $\frac{3x}{10} = 9$

6. $\frac{5x}{11} = 5$

7. $\frac{11x}{12} = \frac{88}{12}$

8. $\frac{7x}{3} = \frac{1}{2}$

9. $\frac{9x}{4} = \frac{3}{2}$

10. $\frac{6x}{5} = \frac{5}{8}$

11. $\frac{9x}{14} = \frac{2}{7}$

12. $\frac{7x}{5} = \frac{3}{8}$

SE-17

Name _____

Solve each equation. Show all work. It is not necessary to check your answer except for your own good.

1. $3x + 2 = x + 12$

2. $5x - 8 = 2x - 32$

3. $2x - 2 - x = 8 - 4x$

4. $5x + x + 3 = x - 3$

5. $7x + x - 2x = -2 - 12 + 2$

6. $9 - 2x + 2 = 4 + 2x + 1$

7. $5 + x - 3 + x = x - 2$

8. $6x - 3 = 2x + 8 - x$

9. $5.3x - 3.4 + x - 7.1 + 1.3x$

10. $\frac{3x}{4} - \frac{5}{6} - \frac{2}{3} = \frac{x}{2} - \frac{2x}{3}$

SE- 18 Name _____

Solve each equation. Show all work and check your answers.

1. $x + x = 5 + 7$

2. $3x + 2x = 17 - 2$

3. $4x + 3x = 56 + 8 - 7 - 1$

4. $6x - 2x - x = 40 + 0 + 5$

5. $7x + 2x - 4x = 46 + 10 - 6$

6. $3.4x + x - .4x = 15 - .7 + 1.7$

7. $5.1x + 3x - 1.1x = 5.6 + .6 - 2$

8. $\frac{3x}{4} + \frac{5x}{3} - \frac{x}{2} = \frac{7}{8} - \frac{5}{6}$

SE-19 Name _____

Solve each equation and show all work.

1. $x = 5 + 7 - x$

2. $3x = 17 - 2 - 2x$

3. $4x = 56 + 8 - 7 - 1 - 3x$

4. $6x = 40 + 5 + 2x + x$

5. $7x = 46 + 10 - 6 - 2x + 4x$

6. $3.4x = 15 - .7 + 1.7 + .4x - x$

7. $5.1x = 5.6 + .6 - 2 + 1.1x - 3x$

8. $\frac{3x}{4} = \frac{7}{8} - \frac{5}{6} - \frac{5x}{3} + \frac{x}{2}$

SE-7 Name _____

Solve each equation for the unknown variable. Show all work. Check your answers.

1. $3x + 5 = 2x - 11$

2. $4x + 4 - x = 2x - 6$

3. $-3x - 4 - x = -6 - 2x$

4. $5x - .6 = 4.5x - 1$

5. $4x + 3 - 2x = -x$

6. $3x - 7x - x = -3 - 4$

7. $5 - 5.6 + 7.1 = -x - x$

8. $34x - 13 = 13 - x - 13 + x$

9. $\frac{3x}{2} + \frac{3}{4} = \frac{2x}{4} - \frac{5}{7}$

10. $\frac{t}{2} - \frac{3t}{2} - \frac{3}{5} = \frac{t}{2} - \frac{5}{3}$

SE-21

Name _____

Solve each equation.

1. $3x + 3 - x - 1 = 2x - x + 4$

2. $-2 - x + 1 = 4x - 3 - x - 2$

3. $-4 - x - 4 - x = -x - 4$

4. $7x + 3 + x + 2 = 7 + 2x + 4$

5. $6 - 3x - 2x + 1 = -x + 2 - 1$

6. $3.4 + 1.2x - \frac{1}{3} + \frac{x}{2} = 4.5 + \frac{3}{4} - x$

Name _____

SE- 1

Remembering the fact that when two fractions are equal, ie. $\frac{a}{b} = \frac{c}{d}$ then a x d = b x c, solve these problems for the unknown variable. Show all your work. Do not use decimals.

Example: $\frac{3}{4} = \frac{x}{12}$

$\frac{4x}{4} = \frac{36}{4}$

$x = 9$

1. $\frac{5}{6} = \frac{10}{x}$

2. $\frac{6}{17} = \frac{x}{43}$

3. $\frac{5}{59} = \frac{1}{x}$

4. $\frac{4}{39} = \frac{1}{x}$

5. $\frac{11}{100} = \frac{100}{x}$

6. $\frac{5}{28} = \frac{8}{2x}$

7. $\frac{6}{15} = \frac{1}{x}$

8. $\frac{8}{29} = \frac{x}{32}$

9. $\frac{14}{3} = \frac{x}{1}$

10. $\frac{6}{22} = \frac{9}{x}$

11. $\frac{17}{x} = \frac{10}{41}$

12. $\frac{15}{x} = \frac{4}{47}$

ACTIVITY

Read page 96.

1. What is a machinist

2. Where might a machinist work in the area around us?

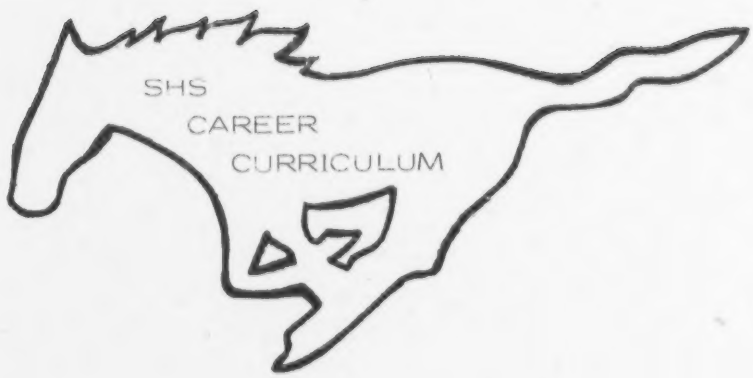
3. In the article on page 96, what did the machinist use algebra for?

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: WE'RE GONNA HAVE TO OPERATE

BY

MR. TINGLE

RATIONALE

Addition, Subtraction, Multiplication and Division of polynomials does not have much practical use in itself, except as an algebraic process. It is, however, a very necessary part of algebra and will be used directly in some of the topics to follow.

BEHAVIORAL OBJECTIVES

1. Given any set of polynomials, you should be able to add them together with 80% accuracy.
2. Given any set of polynomials, you should be able to subtract them with 80% accuracy.
3. Given any set of polynomials, you should be able to multiply them with 80% accuracy.
4. Given any set of polynomials, you should be able to divide them with 80% accuracy.

PRE-EVALUATION

1. $(x + 4) + (x + 7) =$

2. $(2x^2 + 3x - 4) + (x^2 + 5) =$

3. $(7x - 4) - (2x + 3) =$

4. $(5x^2 - 3x) - (2x^2 - 5x + 4) =$

5. $(2x + 3)(x - 4) =$

6. $(3x^2 + 2x - 1)(5x - 2) =$

7. $(x^2 + 7x + 12) \div (x + 3) =$

8. $x^4 + 2x^3 + x^2 + 4x - 2 \div x^2 + 2 =$

9. $(2x - 3)^3 =$

10. $\dfrac{4abc + 8abc^2 + 12a^2b^2c^2}{4ab} =$

You must get 9 correct to skip over this package.

INFORMATION SOURCES

1. Listen to the teacher presentation.
2. Read Chapter 6 in the textbook.

ACTIVITY 1

Add these polynomials.

1. $x + 2$
   $x + 3$

2. $x + 5$
   $x + 6$

3. $x - 4$
   $x - 3$

4. $x - 8$
   $x + 2$

5. $x^2 - 11$
   $x^2 + 3$

6. $x^2 - x$
   $x^2 - x$

7. $3x^2 + 2x + 1$
   $2x^2 + 3x + 4$

8. $5x^2 + 6x - 3$
   $4x^2 - 2x - 4$

9. $6x^2 + 7x + 5$
   $-4x^2 - 3x - 2$

10. $10x^2 + 6x - 11$
    $-5x^2 - 5x - 5$

11. $-7x^3 + 6x^2 + 5x - 3$
    $2x^3 \qquad + 4x + 2$

12. $6.4x^2 - 3.1x + 4.8$
    $2.1x^2 + 2.3x - 6.9$

ACTIVITY 2

Add these polynomials and arrange the terms in the answer in proper order.

1. $(5x^2 + 6x + 3) + (2x - 8)$

2. $(5x - 3x^2 - 1) + (5x^2 - 6x)$

3. $(4x) + (3x^2 - 2x - 1)$

4. $(6x^3 + 2x) + (4x^2 + 3x + 1)$

5. $(9x^2 - 3x) + (3x^3 - 2x)$

6. $(4x + 1) + (2x + 4x^2 + 2)$

7. $(2x + 3) + (x^2 + 2x) + (3x^2 + 4)$

8. $(5x^3 - 6) + (2x^2 + 3x) + (5x^2 - 3)$

9. $(3x^2 + 2x - 1) + (6x - 3) + (2x^2)$

10. $(6x^3 - 5x) + (3x^2 - 5x) + (5x - 2)$

11. $(x) + (2x^2 - 3x) + (x - 2) + (6x + 1)$

12. $(2x^4) + (6x^3 - 2x + 1) + (5) + (2x - x^2)$

ACTIVITY 3

Subtract the bottom polynomial from the top polynomial.

1. $8x + 4$
   $2x + 1$

2. $5x + 3$
   $2x + 2$

3. $6x + 4$
   $4x + 2$

4. $7x + 10$
   $5x + 5$

5. $8x + 2$
   $4x + 1$

6. $9x + 9$
   $3x + 3$

7. $3x - 5$
   $2x - 4$

8. $6x - 8$
   $x + 5$

9. $3x^2 + 2x - 4$
   $x^2 - x + 2$

10. $-4x^2 + 6x - 3$
    $-2x^2 - 4x + 1$

11. $3x^2 + 6x - 5$
    $5x^2 + 8x + 7$

12. $5x^2 + 11x - 3$
    $6x^2 - 4x + 3$

ACTIVITY 4

Subtract these polynomials and put the terms of the answer in proper order.

1. $(3x^2 + 4) - (x + 2)$

2. $(5x^3 - 2x) - (x^2 + 1)$

3. $(6x^3 + 2x - 3) - (5x^2 + x + 2)$

4. $(2x + 1) - (x^2 + 3x + 6)$

5. $(9x^3 - 6x^2 - 7x + 1) - (x^3 + 2x - x^2 + 3)$

6. $(14x + 2x^2 - 1) - (3x^2 - 4x)$

7. $(11x^4 - 6x^2 + 3) - (2x^4 - 6x - 4)$

8. $(5x^3 + 6x^2 - 1) - (8x^3 - 4 + 2x^2 + x)$

9. $(6x^2 + x^3 - x) - (1 + 3x + 4x^2)$

10. $(9x^6 + 3x^4 + 2x + 1) - (5 + 3x^2 + 4x - x^4)$

11. $(11x^2 + 2x^4 + 3x - 1) - (2x^3 - 3x + 2x^4 + 1)$

12. $(2x^2 + 3x - 2) - (4x^3 + x^5 + x)$

ACTIVITY 5

Work:

p. 204: 1-24

p. 206: 1-20

p. 207: 1-20

ACTIVITY 6

Multiply these polynomials.

1. $(x + 5)(x + 2)$
2. $(x + 6)(x + 4)$
3. $(x + 2)(x + 6)$
4. $(x + 7)(x + 5)$
5. $(x + 8)(x + 9)$
6. $(x + 9)(x + 3)$
7. $(x + 2)(x + 1)$
8. $(m + 3)(m + 4)$
9. $(a + 3)(a + 5)$
10. $(a + 4)(a + 8)$
11. $(b + 6)(b + 9)$
12. $(r + 3)(r + 12)$
13. $(2x + 1)(3x + 2)$
14. $(2x + 2)(3x + 1)$
15. $(4x + 3)(5x + 1)$
16. $(6x + 2)(4x + 1)$
17. $(2x + 3)(4x + 4)$
18. $(7x + 1)(8x + 1)$
19. $(9x + 2)(2x + 1)$
20. $(6x + 4)(11x + 3)$
21. $(12x + 5)(4x + 11)$
22. $(2x + 5)(2x + 3)$
23. $(3x + 3)(2x + 2)$
24. $(6x + 3)(11x + 7)$

ACTIVITY 7

Multiply these polynomials.

1. $(x - 9)(x - 3)$
2. $(x - 7)(x - 6)$
3. $(x - 10)(x - 8)$
4. $(x - 7)(x - 9)$
5. $(x - 8)(x - 7)$
6. $(x - 11)(x - 6)$
7. $(x - 5)(x - 12)$
8. $(x - 2)(x - 14)$
9. $(x - 6)(x - 1)$
10. $(x - 12)(x - 8)$
11. $(x - 7)(x - 3)$
12. $(x - 9)(x - 12)$
13. $(x + 3)(x - 5)$
14. $(x - 6)(x + 7)$
15. $(x - 3)(x + 4)$
16. $(x - 7)(x + 5)$
17. $(x - 8)(x + 5)$
18. $(x - 11)(x + 3)$
19. $(x - 6)(x + 5)$
20. $(x - 4)(x + 8)$
21. $(x + 6)(x - 10)$
22. $(x + 10)(x - 4)$
23. $(x + 7)(x - 8)$
24. $(x - 9)(x + 3)$

ACTIVITY 8

Multiply these polynomials.

1. $(3x + 2)(2x - 3)$

2. $(4x + 1)(3x - 2)$

3. $(5x - 1)(2x + 3)$

4. $(6x + 1)(4x - 2)$

5. $(11x - 2)(2x + 1)$

6. $(4x + 7)(2x - 1)$

7. $(3x + 4)(4x - 5)$

8. $(11x - 3)(2x + 6)$

9. $(4x - 5)(x + 1)$

10. $(5x - 4)(x + 2)$

11. $(6x - 3)(2x + 1)$

12. $(4x + 8)(2x - 4)$

13. $(3x^2 + 2x + 1)(x + 2)$

14. $(x^2 + 5x + 1)(x + 4)$

15. $(2x^2 - 5x + 6)(x - 3)$

16. $(4x^2 + 2x + 1)(2x - 3)$

17. $(3x^2 + 4x + 2)(4x^2 + 6x + 1)$

18. $(2x^2 - 3x - 1)(x^2 + x + 4)$

19. $(3x^3 + 6x^2 + x - 2)(2x^2 + 11x - 3)$

20. $(5x^2 + 2x + 6)(3x^3 - x^2 - 2x - 1)$

ACTIVITY 9

Divide these polynomials.

1. $x + 3 \overline{)x^2 + 7x + 12}$

2. $x + 5 \overline{)x^2 + 11x + 30}$

3. $x - 2 \overline{)x^2 - 6x + 8}$

4. $x + 5 \overline{)x^2 + 12x + 35}$

5. $x - 7 \overline{)x^2 - 13x + 42}$

6. $x + 9 \overline{)x^2 + 15x + 54}$

7. $x + 4 \overline{)x^2 + x - 12}$

8. $x - 7 \overline{)x^2 - 4x - 21}$

9. $x + 6 \overline{)x^2 + 4x - 12}$

10. $x^2 - 2x - 1 \overline{)x^3 + x^2 - 7x - 3}$

11. $x^2 + 3x + 2 \overline{)x^4 + 4x^3 + 6x^2 + 5x = 2}$

12. $2x^2 + 4x \overline{)2x^5 + 4x^4 + 4x^3 + 8x^2 + 12x}$

ACTIVITY 10

Give each answer in simplest terms.

1. $(5x^4 - 3.1x^3 + 6.4x^2 + x) + (.1x^4 - 3.2x + 1.8x^3)$

2. $(1/2x^3 - 3/4x^2 + 1/3x - 2) - (2/3x + 4/5x^3 - x^2 - 1/4)$

3. $(.2x^3 + .5x^2 - 3.4)\ (.5x - .1 + 2x^2)$

4. $x^2 + 2x + 4 \overline{)x^4 - 3x^2 - 14x - 12}$

ACTIVITY 11

1. Read p. 224

2. Read p. 235

1. Who was Ahmes?

2. What was his probable occupation?

3. What is a merchandiser?

QUEST

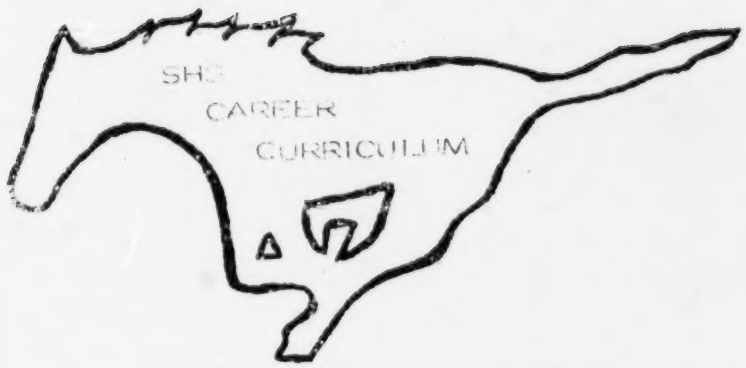
See p. 232 and p. 233 for an exercise in negative exponents.

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: THEY'VE GONE OPPOSITE DIRECTIONS

BY

H. Burton Tingle

RATIONALE

In grade school, you probably were taught that you couldn't subtract big numbers from small numbers. In algebra that is a necessity. The answers you get are called negative numbers. If you look at the number line in the classroom, you will see negative numbers to the left side of zero.

Negative numbers are an important part of mathematics, and an understanding of them is necessary for mastery of algebra.

Negative numbers and positive numbers are called signed numbers.

BEHAVIORAL OBJECTIVES

1. You shoul be able to add, subtract, multiply and divide signed numbers with 90% accuracy.
2. You should be able to find the absolute of a set of integers with 95 % accuracy.

PRE-EVALUATION

1. $8 + 7 =$
2. $-8 - 3 =$
3. $-10 + 4 =$
4. $5 - 3 - 11 =$
5. $6 (-3) =$
6. $(-4) (-5) =$
7. $(-3) (-1) (-2) =$
8. $0 - 3 - 4 =$
9. $- (-2) =$
10. $- (7 - 4) =$
11. $-2 (4 - 6 + 3 - 2) =$
12. $6 \div 3 =$
13. $8 \div -4 =$
14. $-24 \div 3 =$
15. $-30 \div -6 =$
16. $4 - (3 + 1 - 5) =$

You must get 14 correct to skip over this package.

INFORMATION SOURCES

1. Listen to the teacher presentation
2. Read Chapter 4 in the textbook

Name _____

NN- 1

Looking at the numberline posted in the classroom, you will see that there are the regular whole numbers and some other numbers to the left of them with subtraction lines in front of them. These are called Negative Numbers. They can be used in certain numeral representations such as 10^{0} below zero= -10^{0} , a loss of \$100 = - \$100, etc.,etc. Negative numbers are also obtained when larger numbers are subtracted from smaller numbers. 5 - 7 = -2.

If up is positive, to the right is positive, and North and East are positive, represent each of these expressions by either a positive or negative signed number. (Zero is neither positive nor negative)

1. 5 miles North _____
2. 6 feet down _____
3. 8 km West _____
4. a loss of \$5.00 _____
5. a deposit of \$28.50 _____
6. 10^{0} below freezing (F) _____
7. $7\frac{1}{2}$ miles East _____
8. 2,500 miles South _____
9. a debt of \$85.00 _____
10. a 6 yard gain in football _____

11. 5 miles South, then 2 miles North, then 3 miles South. _____
12. a gain of 13 yards, then a loss of 18 yards, then a gain of 4 yards. _____
13. Deposit of \$25, then withdraw \$4, then withdraw \$19. _____
14. 10 miles East, then 8 miles East, then 2 miles West. _____
15. 3,000 feet up, then 1 thousand feet down, then 500 feet down _____
16. Lose \$4, win \$6, lose \$8, lose \$2, win \$8 _____
17. 3 miles South, then South 4 times that far _____
18. Lose \$1.50, then win twice as much _____
19. Gain 4 yards, then lose 5 times as much _____
20. Earn \$4, then pay 7 times as much, then earn \$18 _____

NN-2 Name _____

Give each answer in simplest terms.

1. 5 - 3 = _____
2. 3 - 5 = _____
3. 56 - 17 = _____
4. 17 - 56 = _____
5. 19 - 8 = _____
6. 8 - 19 = _____
7. 5 - 5 = _____
8. -5 + 5 = _____
9. .7 - .7 = _____
10. -.7 + .7 = _____
11. 45.6 - 45.6 = _____
12. -45.6 + 45.6 = _____
13. -3 - 3 - 3 = _____
14. 3 + 3 + 3 = _____
15. 13 + 13 + 13 = _____
16. -13 - 13 - 13 = _____
17. 3.4 + 5.1 + 5.6 = _____
18. -3.4 - 5.1 - 5.6 = _____
19. 3 + 4 - 2 = _____
20. -3 -4 + 2 = _____
21. 7 - 9 + 3 = _____
22. -7 + 9 - 3 = _____
23. 5 + 8 - 10 = _____
24. -5 - 8 + 10 = _____
25. 6 - 5 + 4 - 2 = _____
26. 6 + 4 - (5 + 2) = _____
27. 6 + 4 - 5 - 2 = _____
28. 7 - 8 - 3 + 10 = _____
29. 7 + 10 - (8 + 3) = _____
30. 7 + 10 - 8 - 3 = _____
31. - 8 - 3 + 7 + 10 = _____
32. (10 - 8) + (7 - 3) = _____
33. 5 - 3 + 2 - 1 = _____
34. 56 - 39 - 11 + 44 = _____
35. - 23 + 17 - 7 + 13 = _____
36. 4 - 4 + 4 = _____
37. 4 - 4 - 4 = _____
38. 23 + 89 - 89 + 7 = _____
39. 34 + 17 - 3 - 34 = _____
40. 56 + 109 - 56 + 1 = _____
41. 67.8 + .56 + 1 - 67.8 = _____
42. - 4 - 4 - 4 - 4 - 4 = _____
43. -6 - 6 - 6 - 6 - 6 - 6 = _____
44. - 8 + 8 - 8 + 8 - 8 + 8 - 8 = _____
45. -45 + 46 - 5 + 4 - 3 = _____
46. 89 + 76 - 75 - 88 = _____
47. 3.4 - 3.40 + 5.06 - 5 = _____
48. 8.7 - 7.8 - 6.5 + 5.6 = _____

NN-3 Name _____

When two positive numbers are multiplied together, the answer is positive. When two negative numbers are multiplied together, the answer is positive. When a positive number is multiplied by a negative number, the answer is negative. The same rules are true for division.

Using the above rules, express each of the following in simplest terms.

1. $5(6) =$ _____
2. $-4(3) =$ _____
3. $8(-4) =$ _____
4. $-5(-3) =$ _____
5. $5(-7)(-2) =$ _____
6. $(-17)(-3) =$ _____
7. $6(-1)(-2)(-2) =$ _____
8. $4(-2)(4)(-3) =$ _____
9. $(6)(-6)(1) =$ _____
10. $-2(-2)(-2) =$ _____
11. $7(7)(-1) =$ _____
12. $4(8)(8) =$ _____
13. $-3(-3)(3) =$ _____
14. $-2(4 - 7) =$ _____
15. $3(7 - 4) =$ _____
16. $4(9 - 11) =$ _____
17. $(1 - 2)(2 - 1) =$ _____
18. $(8 - 11)(-6) =$ _____
19. $78(89 - 90) =$ _____
20. $-4(-7 + 7) =$ _____
21. $+6(+4 + 3) =$ _____
22. $\frac{8}{4} =$ _____
23. $\frac{-8}{4} =$ _____
24. $\frac{-8}{-4} =$ _____
25. $\frac{8}{-4} =$ _____
26. $\frac{-34}{-2} =$ _____
27. $\frac{-3(3-4)}{-3} =$ _____
28. $\frac{5(1)(-2)}{10} =$ _____
29. $\frac{8(-7)(2)}{-16} =$ _____
30. $\frac{5(3)(2)(4)}{(-15)(1)} =$ _____
31. $\frac{5(6-8)(2)}{-4-5} =$ _____
32. $\frac{-7+3-2}{-1-1-1} =$ _____
33. $\frac{-7-3(3-2)}{(-3+5)} =$ _____
34. $\frac{10(-5)-1}{-7+4} =$ _____
35. $(5)^3 \div 5^2 =$ _____

NN-4

NAME _____

1. $-4 - 4 =$ _____
2. $-4 + 3 =$ _____
3. $7 - 3 =$ _____
4. $8 + 4 =$ _____
5. $-8 + 2 - 2 =$ _____
6. $9 - 4 - 6 =$ _____
7. $7 - 8 - 3 =$ _____
8. $-5 - 5 - 3 =$ _____
9. $7 + 6 - 5 =$ _____
10. $5 - 7 =$ _____
11. $5 - 8 - 9 =$ _____
12. $9 - 11 - 2 =$ _____
13. $5 + 5 - 5 =$ _____
14. $6 + 2 - 9 =$ _____
15. $5 - 5 - 5 =$ _____
16. $4 - 7 - 3 =$ _____
17. $-4 - 4 - 4 =$ _____
18. $-3 - 5 - 6 =$ _____
19. $-17 - 19 - 23 =$ _____
20. $45 - 56 - 73 =$ _____
21. $78 - 98 - 2 =$ _____
22. $67 + 109 - 57 =$ _____
23. $.98 - 1.08 + .11 =$ _____
24. $3.4 - 3.4 - 43 =$ _____
25. $\frac{1}{2} - \frac{3}{4} + \frac{7}{3} =$ _____
26. $6(-3) =$ _____
27. $4(-5)(-1) =$ _____
28. $6(3) =$ _____
29. $5(7)(-2) =$ _____
30. $8(-9) =$ _____
31. $(8)(3 - 5) =$ _____
32. $(7 - 5)(5 - 7) =$ _____
33. $(9 - 11)(5 - 9) =$ _____
34. $7 + 4(4 - 4) =$ _____
35. $7(-6)(-3) =$ _____
36. $2(3)(-3) =$ _____
37. $56 \div -8 =$ _____
38. $78 \div -2 =$ _____
39. $(45 - 5) \div -5 =$ _____
40. $-9 \div 18 =$ _____
41. $3 \div -9 =$ _____
42. $-24 \div -4 =$ _____
43. $-32 \div -16 =$ _____
44. $-4 \div 16 =$ _____
45. $8 \div -32 =$ _____
46. $63 \div 7 =$ _____
47. $76 \div 4 =$ _____
48. $.008 \div -.2 =$ _____
49. $5.013 \div -.9 =$ _____
50. $\frac{5}{7} \div \frac{-5}{3} =$ _____

NN-5

Name _____

1. 4 + 4 = _____
2. -4 - 4 = _____
3. -4 + 4 = _____
4. 4 - 4 = _____
5. 5 + 5 = _____
6. -5 - 5 = _____
7. -5 + 5 = _____
8. 5 - 5 = _____
9. 3.4 + 3.4 = _____
10. -3.4 - 3.4 = _____
11. -3.4 - 3.4 = _____
12. 3.4 - 3.4 = _____
13. 467 + 476 = _____
14. -467 - 476 = _____
15. 476 - 467 = _____
16. 467 - 476 = _____
17. 5 + 3 = _____
18. -5 - 3 = _____
19. 3 - 5 = _____
20. 5 - 3 = _____
21. 11 + 7 = _____
22. -11 - 7 = _____
23. 11 - 7 = _____
24. 7 - 11 = _____
25. -67 - 34 = _____
26. 7 + 5 = _____
27. 5 + 7 = _____
28. -5 - 7 = _____
29. -7 - 5 = _____
30. 7 - 5 = _____
31. 5 - 7 = _____
32. -7 + 5 = _____
33. -5 + 7 = _____
34. 7.6 + 7.61= _____
35. -7.6 - 7.61= _____
36. 7.61 - 7.6 = _____
37. 7.6 - 7.61 = _____
38. -7.61 + 7.6 = _____
39. -7.6 + 7.61 = _____
40. 45 + 67 = _____
41. 67 + 45 = _____
42. -67 - 45 = _____
43. -45 - 67 = _____
44. 67 - 45 = _____
45. 45 - 67 = _____
46. -67 + 45 = _____
47. -45 + 67 = _____
48. 4 + 4 + 4 = _____
49. -4 - 4 - 4 = _____
50. 4 - 4 + 4 = _____

NN-6

Name _____

1. $15 \div 3 =$ _____
2. $15 \div -3 =$ _____
3. $-15 \div 3 =$ _____
4. $-15 \div -3 =$ _____
5. $3 \div 15 =$ _____
6. $60 \div 5 =$ _____
7. $60 \div -5 =$ _____
8. $-60 \div 5 =$ _____
9. $-60 \div -5 =$ _____
10. $91 \div 13 =$ _____
11. $91 \div -13 =$ _____
12. $-91 \div 13 =$ _____
13. $-91 \div -13 =$ _____
14. $13 \div 91 =$ _____
15. $84 \div 6 =$ _____
16. $48 \div 6 =$ _____
17. $48 \div -6 =$ _____
18. $-48 \div 6 =$ _____
19. $-48 \div -6 =$ _____
20. $6 \div -48 =$ _____
21. $111 \div 3 =$ _____
22. $111 \div -3 =$ _____
23. $-111 \div 3 =$ _____
24. $-111 \div -3 =$ _____
25. $3 \div 111 =$ _____
26. $216 \div 9 =$ _____
27. $216 \div -9 =$ _____
28. $-216 \div 9 =$ _____
29. $-216 \div -9 =$ _____
30. $780 \div 60 =$ _____
31. $780 \div -60 =$ _____
32. $-780 \quad 60 =$ _____
33. $-780 \div -60 =$ _____
34. $480 \div 5 =$ _____
35. $480 \div -5 =$ _____
36. $-480 \div 5 =$ _____
37. $-480 \div -5 =$ _____
38. $.00246 \div .6 =$ _____
39. $.00246 \div -.6 =$ _____
40. $-.00246 \div .6 =$ _____
41. $-.00246 \div -.6 =$ _____
42. $780 \div 10 =$ _____
43. $560 \div -70 =$ _____
44. $8.901 \div -9 =$ _____
45. $34.2 \div .03 =$ _____
46. $23.12 \div -40 =$ _____
47. $-456.3 \div 300 =$ _____
48. $2345.004 \div 1.8 =$ _____
49. $-456.098 \div -56.7 =$ _____
50. $670.0098 \div -200 =$ _____

NN-7

Name _____

1. 4 x 5 = ____
2. 7 x 8 = ____
3. 9 x 7 = ____
4. 6 x 8 = ____
5. 7 x 7 = ____
6. 3 x 88 = ____
7. 7 x 66 = ____
8. 9 x 66 = ____
9. 7 x 33 = ____
10. 9 x 88 = ____
11. 6 x 7 = ____
12. 7 x 6 = ____
13. 6 x -7 = ____
14. -6 x 7 = ____
15. -6 x -7 = ____
16. 12 x 7 = ____
17. 7 x 12 = ____
18. -7 x 12 = ____
19. 7 x -12 = ____
20. -7 x - 12 = ____
21. 5 x 11 = ____
22. 11 x 5 = ____
23. -5 x 11 = ____
24. -11 x 5 = ____
25. -4 x -9 = ____
26. 11 x - 8 = ____
27. -7 x 13 = ____
28. -6 x -14 = ____
29. 7 x 67 = ____
30. -78 x 0 = ____
31. -45 x 1 = ____
32. -89 x -1 = ____
33. 67 x -1 = ____
34. -67 x 6 = ____
35. 78 x -6 = ____
36. 786 x 4 = ____
37. 67 x -34 = ____
38. -43 x 90 = ____
39. -560 x 20 = ____
40. - 789 x 10 = ____
41. 42 x - 409 = ____
42. -765 x -50 = ____
43. 16 x - 25 = ____
44. 34 x -50 = ____
45. 5,678 x 40 = ____
46. -6.9 x -1.2 = ____
47. 4.005 x -0.6 = ____
48. 46.00 x 2.0 = ____
49. .007 x -.11 = ____
50. -1.003 x -1.003 = ____

NN - 8 ACTIVITY

Work page 122: 1 - 12

page 127: 1 - 17

NN - 9 ACTIVITY

Work page 137: 1 - 20

page 141: 19 - 34

NN-10

ACTIVITY

1. $3 - 4 =$
2. $6 - 2 - 3 =$
3. $5 + 2 - 5 =$
4. $4 + (-1) =$
5. $4 - 1 =$
6. $4 - (+1) =$
7. $4 + 1 =$
8. $4 - (-1) =$
9. $6 \div 7 =$
10. $6 + (-7) =$
11. $6 - (+7) =$
12. $6 - (-7) =$
13. $+(+10) =$
14. $-(-10) =$
15. $+(-10) =$
16. $-(+10) =$
17. $-3 - 11 =$
18. $-3 - (-11) =$
19. $-3 + (-11) =$
20. $-3 + (+11) =$
21. $4 + 1 + 2 + 3 =$
22. $4 - (-1) - (-2) - (-3) =$
23. $5 - 3 + 6 - 2 =$
24. $5 + (-3) - (-6) + (-2) =$
25. $5 - (+3) + (+6) - (+2) =$
26. $7 - 3 + 4 - 1 + 6 =$
27. $8 - (-4) + (-3) =$
28. $6 - 5 + (-3) =$
29. $14 - 3 + (-2) =$
30. $4(3 - 5) =$
31. $-3(2) - 3 + 2 =$
32. $4(-1)(-2)^2 =$
33. $(-2)^3(-1) =$
34. $-4(5 + 2 - 1) =$
35. $-(6 - 3 + 2) =$
36. $-2 + 2(6 - 3 - 10) =$
37. $-6 - 3(2 - 3) =$
38. $5 - 8(2 - 3)^2 =$
39. $-6 + 2(3 - 4) + 3 =$
40. $4 - 3 + (-2)(1 - 5) =$

NN-11

ACTIVITY

1. $|-2| =$
2. $|2| =$
3. $|-6| =$
4. $|6| =$
5. $|14| =$
6. $|-14| =$
7. $|3 - 4| =$
8. $|2 + 4| =$
9. $|6 - 7| =$
10. $|5||-2| =$
11. $2|-4| =$
12. $-3|-2| =$
13. $|2| + |-4| =$
14. $|6 - 8| =$
15. $|8 - 6| =$
16. $|9 - 12| =$
17. $|12 - 9| =$
18. $|14 - 10| =$
19. $|10 - 14| =$
20. $|7 - 7| =$
21. $|8| - |6| =$
22. $|6| - |8| =$
23. $|3| - |2| =$
24. $|2| - |3| =$
25. $|5| - |3| =$
26. $|3| - |5| =$
27. $|9||-2| =$
28. $|3| + |2| - |6| =$
29. $|7| - |-8| =$
30. $2|-1||2| =$
31. $|16| + |-2| =$
32. $-2|-1||5| =$
33. $4 - 2|3| =$
34. $6 + 2|1 - 2| =$
35. $5 - 8|-6| =$
36. $|4 - 3 + 1| =$
37. $|8 - 14||2| =$
38. $|9 - 5||6| + 2 =$
39. $3 + 3|9| =$
40. $|-2| + |-4| - 1 =$

ACTIVITY

Signed numbers-Magic Squares

See if you can find the missing numbers. Each column, row, and diagonal should have the same sum.

	-8	2
	0	
-2		-6

	0	10
12	4	
	8	

	-3		8
	6	5	
4	2		7
-1			-4

10	-4		
		4	
3	1	0	6
	8	9	

ACTIVITY

Read p. 151

What are some jobs in which an electrical engineer might work?

What training is necessary to be an electrical engineer?

QUEST

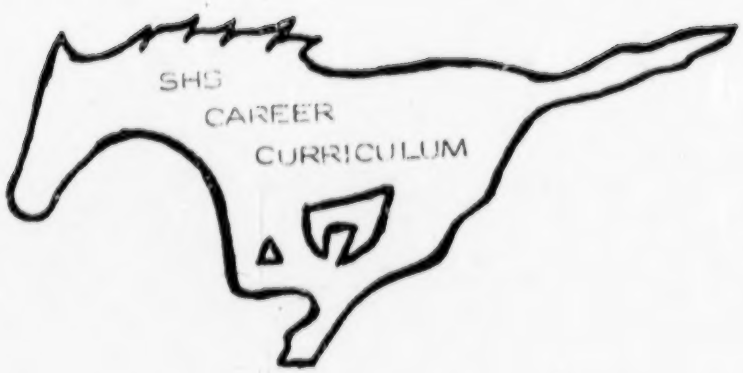
See if you can make up your own magic square with signed numbers. Make it as big as you can, but remember the properties that it must have.

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: THE MASKED NUMBERS RIDE AGAIN

by

H. Burton Tingle

RATIONALE

Algebra is the language of all mathematics and since variables is thelanguage of algebra, it is of maximum importnace that you understand the use of variables. A good understanding of variables is the most important thing in algebra and if you understand them well, algebra will be easy. Knowledge of variables also will afford you an easy method of solving many practical problems.

BEHAVIORAL OBJECTIVES

1. You should be able to give in writing the correct definition of a variable.
2. Given a set of equations with on variable, you should be able to tell what number the variable stands for with 90% accuracy.
3. Given a set of equations with 2 or more variables, and the numbers the variables represent, you should be able to give the value of the expression with 90% accuracy.
4. Given a set of variables, you should be able to add and subtract them with 80% accuracy.

PRE-EVALUATION

1. If $x + 2 = 5$ what number does x stand for?
2. If $5x = 20$ what number does x stand for?
3. If $\frac{x}{2} = 12$ what number does x stand for?
4. If $a = 2$, $b = 3$ and $c = 1$, evaluate $\frac{a + b}{c}$
5. If $a = 0$, $b = 1$ and $c = -1$, evaluate $\frac{(a + b)\, c}{bc}$
6. $x + 2x =$
7. $3x - x =$
8. $8x + 2x - 3x + x =$
9. If $W = \frac{E^2}{R}$ what is W when E is 110 and R is 35?
10. If $I = \frac{E}{R + r}$ what is I if $E = 2.4$, $R = 1.5$ and $r = .03$

You must get 9 correct to skip over this package.

INFORMATION SOURCES

1. Listen to the Teacher Presentation.
2. Read Chapter 2 in the Textbook.

ACTIVITIES

I. Each of these problems is called a variable equation because they have a variable which stands for some number. In each problem, tell what number the variable stands for.

1. $x + 1 = 3$
2. $a + 7 = 10$
3. $6 + b = 8$
4. $5 + t = 15$
5. $r + 1 = 24$
6. $8 - x = 4$
7. $y - 10 = 2$
8. $m - 6 = 0$
9. $14 - 9 = a$
10. $9 - a = 9$
11. $5 \times x = 20$
12. $10 \times 5 = a$
13. $6 \times y = 42$
14. $a \times 9 = 36$
15. $9 \times b = 63$
16. $11 \div m = 1$
17. $64 \div 4 = x$
18. $12 \div a = 2$
19. $k \div 2 = 10$
20. $r \div 1 = 3.6$

Name _____

V- 1

A variable is a letter that stands for a number. In these problems tell what number the variable stands for.

1. $x + 5 = 6$ _____
2. $7 - a = 4$ _____
3. $3 \times b = 12$ _____
4. $x + \frac{1}{2} = 3$ _____
5. $y + .2 = .2$ _____
6. $t = 7$ _____
7. $t + 7 = 13$ _____
8. $x - 3 = 7$ _____
9. $11 - y = 2$ _____
10. $8 \div 2 = x$ _____

Let $a = 1$, $b = 2$, $c = 3$, $d = 0$ and evaluate these variable expressions.

11. $a + b =$ _____
12. $c + d =$ _____
13. $c - a =$ _____
14. $b \times a =$ _____
15. $d \times b =$ _____
16. $b \times b =$ _____
17. $a \times b \times c =$ _____
18. $c \div a =$ _____
19. $b \div d =$ _____
20. $a \div b =$ _____
21. $d \times b \times a =$ _____
22. $c - b =$ _____
23. $\frac{a + b}{c} =$ _____
24. $\frac{c + d}{b} =$ _____
25. $\frac{a + a}{a} =$ _____
26. $\frac{b + b}{b} =$ _____
27. $\frac{c + c}{c} =$ _____
28. $\frac{a + b}{c + d} =$ _____
29. $\frac{b - a}{c \times a} =$ _____
30. $\frac{b \times c}{a \times a} =$ _____
31. $\frac{b + c}{b \times c} =$ _____
32. $\frac{b + b + c}{a \times b} =$ _____

ACTIVITIES

II. When variables are written next to each other without any signs between them, it is understood that they are to be multiplied together.

Example 1: abc means a x b x c

If the variables are enclosed in parentheses or other grouping symbols and written next to each other without any signs between them, it is also understood that they are to be multiplied.

Example 2: (a)(b)(c) means a x b x c

If a variable appears next to a parenthesis without any signs between them, it is understood to mean multiplication.

Example 3: a(b)cd means a x b x c x d

Let a = 0, b = 1, c = 3, d = 2 and evaluate these variable expressions

1. a b = _____
2. b c = _____
3. d a = _____
4. a c = _____
5. b d = _____
6. c d = _____
7. a a = _____
8. b b = _____
9. c c = _____
10. d d = _____
11. a (b c) = _____
12. (a) b c = _____
13. b (c) d = _____
14. a (a + c) = _____
15. b (a + b) = _____
16. a b (c) d = _____
17. b (c)(d + a) = _____
18. (a + b)(c + d) = _____
19. (b + 3)(2) = _____
20. 2 (a)(3)(b) = _____
21. $\frac{(a + b)\ c}{d}$ = _____
22. $\frac{(b + 2)\ c}{c}$ = _____
23. $\frac{e\ (d)\ 3}{3b}$ = _____
24. $\frac{4\ b\ c\ d}{2b}$ = _____
25. $\frac{5\ c\ d}{b\ c}$ = _____
26. $\frac{4\ (a + b)\ c}{c\ d}$ = _____
27. $\frac{6\ b\ c\ d}{2\ a}$ = _____

ACTIVITIES

III. Let a = 3, x = 7, t = 10 and evaluate these variable expressions.

1. $a + 4 =$
2. $4a =$
3. $7 + x =$
4. $7x =$
5. $8 + t =$
6. $8t =$
7. $a + 7 =$
8. $7a =$
9. $8 + x =$
10. $8\ x =$
11. $a + 12 =$
12. $12\ a =$
13. $t + 10 =$
14. $10\ t =$
15. $t + \frac{1}{2} =$
16. $\frac{1}{2}\ (t) =$
17. $x + .5 =$
18. $.5\ x =$
19. $.6a =$
20. $9 + x =$
21. $9x =$
22. $.71 + t =$
23. $.71t =$
24. $.82 + x =$
25. $.82x =$
26. $a + \frac{3}{4} =$
27. $\frac{3}{4}\ (a) =$
28. $x + \frac{5}{8} =$
29. $\frac{5}{8}\ (x) =$

ACTIVITIES

IV. Each of the problems on this page are called variable expressions. Let a = 2, b = 3, c = 1 and evaluate these variable expressions.

1. $a + b =$
2. $c + b =$
3. $4 + a =$
4. $5 - c =$
5. $c + 2 + b =$
6. $4 - a + b =$
7. $a + b - c =$
8. $9 (a + b) =$
9. $a (b + c) =$
10. $c (a + b) =$
11. $(a + b) \div c =$
12. $3a (b + c) =$
13. $c (b - a) =$
14. $a^2 (b^2 + c^2) =$
15. $a^2 + b^2 =$
16. $a^3 =$
17. $c^5 =$
18. $c^4 (a^4 + 1) =$
19. $a b (a + b) =$
20. $c (a + b)^2 =$
21. $(a + c)(a + c) =$
22. $b^3 (a c) =$
23. $b (a - c)^2 =$
24. $(b - 3)^3 =$
25. $(a b c)^2 =$
26. $(a + b)(a)^2 =$
27. $\frac{b + c}{a} =$
28. $(a + b + c)^3 =$

ACTIVITIES

V. Evaluate these variable equations.

1. Total Resistance of a circuit connected in parallel--

$$Rt = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

Find Rt if $R_1 = 100$, $R_2 = 120$, $R_3 = 160$

2. Kilowatt load of an electric circuit--

$$Kw = \frac{ExI}{1000}$$

Find Kw if E = 230 and I = 124

3. Current for batteries connected in series--

$$A = \frac{nE}{R + nr}$$

Find A if n = 3 , E = 1.5 , R = 12 and r = .1

4. Degrees Fahrenheit to degrees centigrade--

$$C = \frac{5}{9}(F - 32)$$

Find C if $F = 86^\circ$

5. Taper pin diameter in gears formula--

$$d = D - \frac{L \times .25}{12}$$

Find d if D = .375 , L = 4

6. Distance an object falls in the earths gravity--

$s = \frac{1}{2} gt^2$ Find s if g = 32.2 and t = 10

7. Horsepower of any piston engine--

$HP = \frac{PLAN}{33,000}$ Find HP if P = 125 , L = 2.75 , A = 10 and N = 3000

8. Resistance of an electrical conductor--

$R = \frac{kl}{d^2}$ Find R if k = 10.37 , l = 200 and d = 25

9. Distance traveled--

d = rt Find d if r = 70 and t = 3

10. Interest--

I = prt Find I if p = 400 , r = .05 and t = 2

V-5 Name _____

Find the value of each of the following expressions, by letting the variables have the indicated values.

$x = 3$

1. $7 + x =$ _____
2. $7x =$ _____

$x = 5$

3. $9 + x =$ _____
4. $9x =$ _____

$c = 6$

5. $6 + c =$ _____
6. $6c =$ _____

$s = 5.6$

7. $9.8 + s =$ _____
8. $9.8s =$ _____

$y = \frac{2}{3}$

9. $12 + y =$ _____
10. $12y =$ _____

$t = 76$

11. $95 + t =$ _____
12. $95t =$ _____

$x = \frac{3}{5}$

13. $\frac{5}{6} + x =$ _____
14. $\frac{5}{6}x =$ _____

$x = 5$

15. $12 - x + 4 =$ _____
16. $12 + 4 - x =$ _____

$x = 19$

17. $34 - x + 46 =$ _____
18. $34 + 46 - x =$ _____

$d = 7.3$

19. $6.7 + d - 3.4 =$ _____
20. $6.7 - 3.4 + d =$ _____

$x = 5.67$

21. $7.8 + 6.07 - x =$ _____
22. $7.8 - x + 6.07 =$ _____

$y = 9\frac{3}{4}$

23. $20\frac{1}{3} + y - 19\frac{3}{8} =$ _____
24. $20\frac{1}{3} - 19\frac{3}{8} + y =$ _____

$x = 4506$

25. $5{,}679 - x + 789 =$ _____
26. $789 + 5{,}679 - x =$ _____

$y = 3t$

27. $5t - y + 18t =$ _____
28. $5t + 18t - y =$ _____

ACTIVITY

VI. Let a = 1, b = 3, c = $\frac{1}{2}$ and evaluate each of the following variable expressions.

_____	1.	a + a	16.	2a	_____
_____	2.	b + b	17.	2b	_____
_____	3.	3b + 3b	18.	6b	_____
_____	4.	5b + 6b	19.	11b	_____
_____	5.	2c + 4c	20.	6c	_____
_____	6.	7a + 2a	21.	9a	_____
_____	7.	a + 2a + a	22.	4a	_____
_____	8.	2c + 6c	23.	8c	_____
_____	9.	6a + a + a	24.	8a	_____
_____	10.	5a - 2a	25.	3a	_____
_____	11.	6c - 4c	26.	2c	_____
_____	12.	6b - 2b - b	27.	3b	_____
_____	13.	7c - 5c -c	28.	c	_____
_____	14.	11a - 3a + 2a	29.	10a	_____
_____	15.	3.6b - 1.8b + b	30.	2.8b	_____

ACTIVITIES

VII. Using the preceeding page as a help, combine the variable terms into simplest possible terms.

1. $2a + 2a$ _____
2. $5a + 6a$ _____
3. $5m + 2m$ _____
4. $10a - 3a$ _____
5. $6a - 4a$ _____
6. $10x + 2x$ _____
7. $x + 2x$ _____
8. $3y + 7y$ _____
9. $48x - 32x$ _____
10. $17y - 8y$ _____
11. $10m + 23m$ _____
12. $47a - 39a$ _____
13. $16a - 9a$ _____
14. $18a + 24a$ _____
15. $18a + 481a$ _____
16. $a + 2a + 4a$ _____
17. $6b + 7b - 2b$ _____
18. $11b - 8b - b$ _____
19. $x - x + 2x + 3x$ _____
20. $5x - 4x + x$ _____
21. $6x - 2x - 3x - x$ _____
22. $13x - 2x + x$ _____
23. $11x + 5x - 10x$ _____
24. $15x - 10x - 4x$ _____
25. $14v - 11v + v$ _____
26. $20x - 19x + 4x$ _____
27. $37x - 9x - 14x$ _____
28. $41a - 22a - 3a$ _____
29. $12a + 13a - 20a$ _____
30. $10a - 9a + a$ _____

V-7 Name _____

1. $x + x =$ ____

2. $3x + 2x =$ ____

3. $4x + 3x =$ ____

4. $6x - 2x - x =$ ____

5. $7x + 2x - 4x =$ ____

6. $3.4x + x - .4x =$ ____

7. $5 + 7 =$ ____

8. $17 - 2 =$ ____

9. $56 + 8 - 7 - 1 =$ ____

10. $40 + 0 + 5 =$ ____

11. $46 + 10 - 6 =$ ____

12. $15 - .7 + 1.7 =$ ____

13. $5.1x + 3x - 1.1x =$ ____

14. $5.6 + .6 - 2 =$ ____

15. $\frac{3x}{4} + \frac{5x}{3} - \frac{x}{2} =$ ____

16. $\frac{7}{8} - \frac{5}{6} =$ ____

V-3

Name _____

1. $3x = 1$ _____
2. $4y = 1$ _____
3. $6t = 1$ _____
4. $9t = 1$ _____
5. $11x = 1$ _____
6. $.8\ x = 1$ _____
7. $\frac{1}{2}a = 1$ _____
8. $45z = 1$ _____
9. $9.09k = 1$ _____
10. $3\frac{1}{2}x = 1$ _____
11. $5 \times \frac{2}{5} =$ _____
12. $\frac{4}{7} \times 7 =$ _____
13. $8 \times \frac{7}{8} =$ _____
14. $\frac{9}{10} \times 9 =$ _____
15. $.3 \times 10 =$ _____
16. $.5 \times 10 =$ _____
17. $\frac{3(2)}{3} =$ _____
18. $\frac{5(5)}{5} =$ _____
19. $\frac{7(4)}{4} =$ _____
20. $\frac{5(9)}{9} =$ _____
21. $\frac{4(3)}{4} =$ _____
22. $\frac{3.4(5.1)}{5.1} =$ _____
23. $\frac{31(.9)}{31} =$ _____
24. $4 \times \frac{1}{4} \times 3 =$ _____
25. $5 \times \frac{1}{5} \times 2 =$ _____
26. $6 \times \frac{1}{6} \times 5 =$ _____
27. $4 \times \frac{3}{4} =$ _____
28. $5 \times \frac{2}{5} =$ _____
29. $6 \times \frac{5}{6} =$ _____
30. $7 \times \frac{1}{7} \times 3 =$ _____
31. $8 \times \frac{1}{8} \times 5 =$ _____
32. $2 \times \frac{1}{2} \times 7 =$ _____
33. $7 \times \frac{3}{7} =$ _____
34. $8 \times \frac{5}{8} =$ _____
35. $2 \times \frac{7}{2} =$ _____
36. $3 \times \frac{t}{3} =$ _____
37. $4 \times \frac{m}{4} =$ _____
38. $5 \times \frac{6k}{5} =$ _____
39. $6 \times \frac{r}{6} =$ _____
40. $7 \times \frac{5h}{7} =$ _____

ACTIVITIES

VIII. Let r = 2 , s = 3 and evaluate each of these variable expressions.

1. 3 (2r) _____
2. 4 (3s) _____
3. 5 (2r) _____
4. 3 (6r) _____
5. 4 (5s) _____
6. 4 (2s) _____
7. 8 (3r) _____
8. 6 (5r) _____
9. 3 (5s) _____
10. 4 (6r) _____
11. 4 (7r) _____
12. 9 (3r) _____
13. 10 (3s) _____
14. 11 (2s) _____
15. 6 (2s) _____
16. 6r _____
17. 12s _____
18. 10r _____
19. 18r _____
20. 20s _____
21. 8s _____
22. 24r _____
23. 30r _____
24. 15s _____
25. 24r _____
26. 28r _____
27. 27r _____
28. 30s _____
29. 22s _____
30. 12s _____

ACTIVITIES

IX. Express each of the following in simplest terms. No answer has a parenthesis.

1. 3 (4x)
2. 7 (8x)
3. (8) 3x
4. (3)(2x)
5. (7) 5t
6. 9 (7a)
7. 11 (5a)
8. 12 (6a)
9. 13 (3x)
10. 15 (4)(x)
11. 6 (3)(x)
12. 6 (x)(3)
13. x (4)(7)
14. 3x (7)
15. x (3)(12)
16. 4 (x)(.3)
17. .2x (2)
18. (7x)(3)
19. 4 (2)(x)(.1)
20. (2x)(2)(3)(4)
22. 4 (x)(2)
23. 5 (x)(2)
24. 5x5
25. .8x (.7)
26. 9 (6)(1x)
27. 7 (7)(x)(.2)
28. (.2)(.2)(x)
29. (.3)(.1)(2x)
30. 6 (.2)(.01x)
31. (x)(1)(.2)(3)

V-4

Name _____

Give each answer in simplest terms.

1. $3(x)(3) =$ _____
2. $3x + 5x =$ _____
3. $4(3)c =$ _____
4. $5x - 3x =$ _____
5. $5(3)(2)d =$ _____
6. $4s - 2s =$ _____
7. $7a - 4a =$ _____
8. $(C)(3)(6) =$ _____
9. $w(2)(1) =$ _____
10. $3s(4) =$ _____
11. $3d + 5.3d =$ _____
12. $5a(2)(2)(1) =$ _____
13. $5(x + 2x) =$ _____
14. $7(3s - 2s) =$ _____
15. $4(5x + 2x) =$ _____
16. $2.3(3a + 2a) =$ _____
17. $6(4.3a + 7.4a) =$ _____
18. $3(4.5a - .6a) =$ _____
19. $(3 + 2)(a + a) =$ _____
20. $(4 - 3)(2x + 3x) =$ _____
21. $(5+ 1)(3z - 2z) =$ _____
22. $.4(x + 2x)10 =$ _____
23. $3(4c + 2c)2 =$ _____
24. $5x(4) =$ _____
25. $5.3x + 3.4x =$ _____
26. $6.7k - 3.9k =$ _____
27. $a + a + a =$ _____
28. $3z - z - z =$ _____
29. $6b - 5b - b =$ _____
30. $3s - 5s + 4s =$ _____
31. $a(a) =$ _____
32. $3s + (2)(2)s =$ _____
33. $7b - 2b + b =$ _____
34. $5t + t + t + t =$ _____
35. $x - x - x + x =$ _____
36. $t(t)t(t) =$ _____
37. $x + x + x + x + x =$ _____
38. $7(3)(s)(2) =$ _____
39. $6x(x) =$ _____
40. $5d - d - d =$ _____
41. $5h + (h)3 =$ _____
42. $3(x + x - x) =$ _____
43. $c(4 + 4 - 7) =$ _____
44. $g(7.6 - 7.5) =$ _____
45. $a(3 + 2 - 4)a =$ _____
46. $x[3 + 2 + (2x - x) - 5] =$ _____

V-6

Name _____

Express each of the following in simplest terms.

1. $3s - 2s =$ ____
2. $-1 - 5 =$ ____
3. $-4x - 4x =$ ____
4. $4 + 4 =$ ____
5. $8 \div -8 =$ ____
6. $2x + 4x =$ ____
7. $6x - 5x =$ ____
8. $-10 + 3 =$ ____
9. $-5b\ -2b + 2b =$ ____
10. $3 + 3 =$ ____
11. $6 \div -5 =$ ____
12. $+5 - 2 =$ ____
13. $7x - 2x =$ ____
14. $-1 - 3 =$ ____
15. $-4 \div 5 =$ ____
16. $3x - 4x =$ ____
17. $-x\ -x =$ ____
18. $-10 \div -2 =$ ____
19. $8x - 2x =$ ____
20. $6x - 2x =$ ____
21. $-4 - 4 =$ ____
22. $-8 \div 4 =$ ____
23. $5.6z - .6z =$ ____
24. $5z + 2z =$ ____
25. $-1.1 + 6 =$ ____
26. $4.9 \div 7 =$ ____
27. $2.3x + 1.7x =$ ____
28. $1 + 4 =$ ____
29. $5 \div 4 =$ ____
30. $\frac{2x}{3} + \frac{2x}{3} =$ ____
31. $\frac{-13}{4} + \frac{4}{3} =$ ____
32. $\frac{-23}{12} \div \frac{4}{3} =$ ____
33. $-5 - 3 + 5 =$ ____
34. $5 - .6 + 2.1 =$ ____
35. $11 + 3 - 3.4 =$ ____
36. $(7)(-4) =$ ____
37. $-4 + 3 - 2 =$ ____
38. $9 + 7 - 8 =$ ____
39. $4x - 2x - x =$ ____
40. $7b + 2b - 11b =$ ____
41. $2.3x - 2x - .1x =$ ____
42. $x - x - x =$ ____
43. $6c + c - c + c =$ ____
44. $5 - 8 - 11 =$ ____
45. $-5 - 17 =$ ____
46. $-4.5 + 5.1 - .72 =$ ____

ACTIVITY

Read p. 62

1. How was Vieta able to break the Spanish secret war code?

2. If he was a lawyer, why was he using algebra?

3. Compare to page 33!

4. Using some special code language make up a secret message.

5. What are some requirements for espionage (spying) work?

1. A worker in a factory produces parts as follows: 442, 297, 649, 315, 774, 197, and 145 pieces. What was the total number of articles produced? _____

2. The weight of six machines are 3274 lbs., 4572 lbs., 1719 lbs., 453 lbs., 11452 lbs., and 2244 lbs. Find the total weight. _____

3. Five sums of $5633, $7474, $9763 and $3392 are invested in a concern. What is the total investment? _____

4. On a certain job the following lengths of steel were used: 221 inches, 197 inches, 34 inches, 107 inches, 347 inches, 239 inches, and 146 inches. Find the total length. _____

5. A tool crib had the following items in stock: 239 toolbits, 347 drills, 562 2-inch washers, 747 cotter pins and 658 Whitney keys. Find the total number of articles. _____

6. A pattern maker used the following lengths of wood in making a pattern: 67 inches, 22 inches, 38 inches, 45 inches, [illegible] inches and 13 inches. Find the length of material used _____

7. When checking the time for a certain die job, the card showed these items: 143 hours on lathe, 246 hours on milling, 47 hours on grinder and 15 hours of hardening. What was the total amount of time required for this job? _____

8. A foremen paid his workmen these wages for a 40-hour week: $72.00, $98.00, $84.00, $67.00, $59.00 and $107.00. What was the total amount paid? _____

9. A machinist cut the following lengths of chain for a certain job: 105 feet, 1784 feet, 98 feet, 663 feet, 454 feet, 8974 feet, and 27 feet. What was the total length used? _____

10. It is desired to cut several pieces from a 1" diameter rod. If the lengths are to be 7", 12", 14", 31", and 3", what will be the total length of rod required? _____

11. From a piece of hexagon stock that is 1" across flats, 5 pieces are to be cut off, not including waste. If the pieces are 11", 19", 13", 23", and 15", what is the total length of rod required? _____

12. In a stock room an inventory of items included 5 milling cutters, 17 cut-off tools, 23 spur gears and 49 mill files. How many pieces were included in the inventory? _____

13. It is desired to lay out a group of machines in a straight line. If two feet are to be allowed between each machine and there are 5 machines of 12, 7, 8, 13, and 15 feet lengths, what is the total length of the line? _____

14. A stock room has 6 boxes of No. 10 hex head cap screws. If the boxes contain 144, 72, 89, 159, 603, and 302 screws respectively, how many screws of this seze are in stock? _____

15. Seven individually powered machines have motors drawing 150, 760, 852, 675, 128, 935, and 440 watts each. What is the total wattage used when: (a) the total shop is in operation? (b) the three smallest motors are running? (c) the three largest motors running? _____

16. It is necessary to turn in time cards for each job completed during the week so that the cost for each job can be calculated. If a man worked on 4 jobs requiring 632, 945, 89 and 665 minutes respectively, how many minutes did he work on these jobs during the week? How many minutes? _____

17. What were the total deductions from a man's pay check if the items deducted were: $1.89 for old age assistance, $8.00 for taxes, $2.25 for union dues, $1.50 for hospitalization and $8.09 for bonds? _____

1. Four bricklayers employed on a job each laid the following number of bricks in one day: 1st bricklayer, 925 bricks; 2nd, 1075 bricks; 3rd, 1035 bricks; 4th, 1150 bricks. What was the total number of bricks laid that day? _____

2. A mason purchased the following number of bags of cement at different dates in the month; 235 bags, 160 bags, 62 bags, 24 bags, 175 bags. How many bags of cement should he be billed for? _____

3. The costs of the material and labor for building a concrete sidewalk were as follows: $26 for sand, $52 for gravel, $90 for cement, and $85 for the labor. What was the total material and labor cost for the job? _____

4. A bricklayer was paid the following sums of maney in one month for wages: $44, $52, $48, and $37. What was the total sum he reveived? _____

5. A contractor paid $480 for brick, $3 for lime, $8 for cement, and $5 for sand. What was the total cost of the materials? _____

6. A moson gave separate estimates on the following items: building foundation walls for house $375, building a chimney $95, laying concrete sidewalds $75, building concrete stairs $85. What was the estimate for all of the work? _____

7. Find the total price to be charged for digging a cellar if $32 was allowed for the hire of horses and carts, $75 for labor, and a charge of $40 was made for use of equipment and the supervision of the work. _____

8. In figuring the cost of mason work on a certain job the mason allowed $250 for concrete work, $125 for brick work, $115 for excavating, and $225 for plastering. What was his total estimate for the job? _____

9. A contractor separated his estimate on a job as follows: excavating $130, concrete work $285, grading the grounds $90, brick work $105. What was his total estimate? _____

10. Three bricklayers laid the following amounts of face brick in one day: 1st bricklayer, 675 bricks; 2nd bricklayer, 725 bricks; the 3rd bricklayer, 685 bricks. How many bricks were laid by these men? _____

11. A contractor received the following amounts of common bricks on a job at different dates: 5,000 bricks, 2,500 bricks, 5,000 bricks, and 7,500 bricks. How many bricks did he receive in all? _____

12. A mason paid $27 for 6 wheelbarrows, $15 for a dozen martar hoes, and $15 for a dozen shovels. What was the total cost of the equipment purchased? _____

13. A mason paid $23 for flue lining, $67 for brick, $5 for sand, $9 for cement and $3 for lime. What was the total cost of the material purchased? _____

14. Find the cost of laying a concrete sidewalk if the cement cost $40, sand $12, gravel $18, and the labor came to $32. _____

15. In figuring the cost of a job the mason allowed $165 for excavating a cellar, $310 for concrete work, $250 for brick work, $325 for plastering, and $125 for grading the lot. What was the estimate for the job? _____

16. Weight slips on five loads of 1" crushed stone delivered in one day on a certain job were 6125 lbs., 6090 lbs., 6215 lbs., 5995 lbs., and 6165 lbs. What was the total weight of stone that the contractor would be billed for on that day? _____

17. A mason contractor specializing on boiler settings placed the following order for firebricks, 3250 stretchers, 185 No. 1 sidearches, 95 No. 2 side arches, 110 No. 1 end wedges, 37 end skews, 125 splits, 40 soaps, and 14 feather edges. How many firebricks were on that order? _____

18. The deliveries of fibered gypsum, by a mason's supply dealer to a plastering contractor on various jobs, were as follows: June 1st, 42 bags; June 3rd, 9 bags; June 14th, 87 bags; June 18th, 128 bags; July 19th, 13 bags; July 21st, 54 bags; July 25th 27 bags; and July 28th, 95 bags. How many bags of fibered gypsum did he received during each month? _____

12. The cost of magnet wire for a motor repair shop during 3 months was as follows: 200 lbs. of #17 S C E, (single cotton enamel) $58.00; 250 lbs. of #16 S C E, $55.00; 50 lbs. of #21 S C E, $19.00; 30 lbs. of S C E, $24.00. What was the total cost of magnet wire during this period? _____

13. BX cable in the following amounts was used on an apartment house job: 625 ft., 785 ft., 140 ft., 310 ft., 325 ft. and 120 ft. What was the total amount used on the job? _____

14. A resedence has lamps and appliances in its various rooms which have the following wattage: living room, 150 w. (watts); dining room, 125 w; bathroom, 75 w. What is the total load when all lamps and appliances are operating? _____

15. The following number of BX cable clips were used during a given period: 250,125, 65, 36, 48, 96, 92, 28, 42, 106, 140, and 24. What was the total number of BX cable clips used during this period? _____

16. An electrical contractor received during the first quarter of the year the following quantities of #14 D.B.R.C. (double braided rubber covered) wire: Januaryl, 7500 ft. of white solid wire; March 1, 10,750 ft. of black solid wire and 4500 ft. of w-ite solid wire. What was the total number of feet of white, black and stranded wire received during this period? _____

1. When taking inventory, the following lots of 4" X 3/8" BX connectors were found in five different bins: 176, 264, 375, 234 and 116. What was the total number of connectors in all bins? _____

2. In eight different boxes there are the following number of 3/4" #8 F.H. (flat head) bright wood screws: 124, 72, 36, 92, 38, 64, 74, and 67 respectively. What is the total no.? _____

3. In wiring eight houses the electricians find that they must install 68, 58, 89, 84, 72, 59, 69, and 57 outlets respectively. How many outlets must be roughed-in all together? _____

4. In the course of 4 months an electrician used the following switch outlet boxes on different jobs: 56, 9, 86, 36, 93, 105, 42 and 56. What is the total number used? _____

5. The following materials were charged to a wiring job: meter board, $2.00, meter switch, $8.00; conduit, $4.00; #8 wire, $1.00; BX cable, $25.00; conduit fittings, $3.00; outlet boxes, $4.00; switches, $3.00; fixtures, $65.00 and $2.00 for tape, solder, staples and pipe clips. What was the total amount charged for materials? _____

6. An electrician took out of stock at different times the following amounts of BX: 500', 1200', 250', 90', 38', 65', 84', 225', and 125' respectively. What was the total number of feet of BX taken out? _____

7. From 2 barrels of dry cells 325 cells were placed in the stock room, 45 cells were placed on the shelf in the show room and 18, 25, 30, 24, and 6 dry cells were sold. What was the total number of cells packed? _____

8. A factory department has 10 motors of 75, 30, 200, 40, 25, 15, 5, 125, 150, and 175 hp. (horsepower.) What is the combined horsepower of the 10 motors? _____

9. An electrical supply house purchased in separate lots 35, 40, 125, 200, 75, 90, 20, and 30 lbs. of solder. What was the total number of pounds of solder purchased? _____

10. During a certain year the monthly consumption of current in kilowatt hours in a certain house was as follows: Jan., 45; Feb., 40; Mar.,42; Apr., 38; May, 37; June, 32; July, 31; Aug., 33; Sept., 38; Oct., 40; Nov., 42; Dec., 58. Find the total consumed during the year. _____

11. A school has twelve electrical circuits which have a capacity of 545, 650, 750, 1820, 2462, 2571, 1360, 1540, 793 watts respectively. What is the total number of watts consumed when all these circuits are being used under their total loads? _____

1. In wiring a trailer the following lengths of wire were used: 6', 3', 8', and 10'. What was the total length of wire used? _____

2. In repairing a car the following number of new bolts were necessary: 5 head bolts, 8 oil pan bolts, 3 fender bolts, and 6 different cover bolts. How many bolts were used in all? _____

3. In taking inventory the following spark plugs were checked: 100-14 M.M. plugs, 72-1/2" plugs and 15-10M.M. plugs. What was the total number of plugs on inventory? _____

4. A mechanic ordered the following lengths of brake lining: one piece 15" long, one piece 8", one piece 10", one piece 11", one piece 16", one piece 9", two pieces 12". What total length of lining was required for the job? _____

5. On five different trips an automobile is driven 33 miles, 27 miles, 19 miles, 42 miles, and 24 miles. What is the total mileage driven? _____

6. What is the total gasoline consumption for one week if a driver uses 10 gals. on Sunday, 6 gals. on Monday, 2 gals. on Tuesday, 9 on Wednesday, 8 on Thursday, 3 gals. on Friday, and 12 gals. on Saturday? _____

7. A mechanic removes 27 nuts from the cylinder head, 34 nuts from the oil pan and 9 nuts from the fly-wheel housing. What is the total number of nuts removed? _____

8. The headlights draw 10 amperes of current, the ignition coil draws 4 amps., the taillights draw 2 amps, the car heater 8 amps. What is the total amperage draw from the battery? _____

9. An automotive stock clerk has 53 one-half inch castellated nuts in stock. He orders 864 additional nuts. How many does he then have in stock? _____

10. The driver drove his car 129 miles to one city, 134 miles to another, and 219 miles home. What was the total mileage driven? _____

1. What is the total floor space in a basement with a recreation room, store room and laundry containing 286 sq. ft., 91 sq. ft., 164 sq. ft. respectively? _____

2. A carpenter put on 348 sq. ft. of shingles the first day, 430 sq. ft. the second and 368 ft. the third. How many square feet of shingles did he put on in three days? _____

3. Find the total number of square inches of plywood in four pieces containing 640 sq. in., 1,126 sq. in., 719 sq. in. and 1,340 sq. in. _____

4. A contractor paid bills of $2,480, $765, $1,446, $1,011, and 1,610 for materials. What was the total cost of the materials? _____

5. In making five excavations, the following cubic yards of earth were removed: 5,040; 6,070; 7,940; 11,424 and 25,216. Find the total number of cubic yards removed. _____

6. Three deliveries of 1" X 6" matched roofers were as follows: 2,450 bd. ft. (board feet), 2,760 bd. ft., and 2,875 bd. ft. What was the total number of bd. ft. delivered? _____

7. A carpenter laid 1,300 wood shingles the first day, 1,400 the second and 1,500 the third. How many sq. ft. did he apply? _____

8. In a certain house, a builder applied 528 sq. ft. (square feet) of gypsum wall board in the kitchen, 640 sq. ft. in the living room and 580 sq. ft. in the dining room. How many sq. ft. did he apply? _____

9. A contractor bought 14,500 bd. ft. of 1" native pine, 1,250 bd. ft of 2" spruce and 1,450 bd. ft. of 3" hemlock. How many bd. ft. of lumber did he buy in all? _____

10. The material for a bar cost as follows: lumber $476.00; masonry $148.00; hardware $62.00 and painting $85.00. What was the total cost of materials? _____

11. In estimating the finished flooring for a house, a contractor listed the room areas as follows: living room 168 sq. ft.; dining room 152 sq. ft.; bedroom 142 sq. ft.; hall 45 sq. ft. and kitchen 125 sq. ft. What was the total area to be floored? _____

12. For building a house, the following items of framing timber were ordered: 472 bd. ft. of 2" X 4" studs; 1,627 bd. ft. of 2" X 10" joists; 827 bd. ft. 2" X 6" stock; 572 bd. ft. of 2" X 8" stock. How many bd. ft. of framing timber were ordered? _____

13. How many lineal feet of 1" X 6" ribband are needed for a building 26' by 42'.

ACTIVITY #1

1. 13 inches
16 inches
8 inches
24 inches
11 inches
23 inches

2. 270 feet
140 feet
368 feet
609 feet
306 feet
224 feet

3. 261 sq. inches
1094 sq. inches
644 sq. inches
1326 sq. inches

4. 1312 cu. inches
644 cu. inches
31 cu. inches
3609 cu. inches
243 cu. inches

5. 1608 yards
914 yards
83 yards
1144 yards

6. 23 sq. feet
1116 sq. feet
2492 sq. feet
3844 sq. feet

7. 3002 sq. yards
994 sq. yards
681 sq. yards
2411 sq. yards

8. $12,492
2,063
3,876
9,432

9 431 pounds
1243 pounds
709 pounds
1652 pounds
8067 pounds

10. 3602 gallons
1306 gallons
3914 gallons
3010 gallons
984 gallons

11. 15,642 cu. yards
8,431 cu. yards
13,092 cu. yards
15,842 cu. yards
4,467 cu. yards

12. 5,148 B.t.u.
12,648 B.t.u.
7,968 B.t.u.
26,606 B.t.u.
7,644 B.t.u.
34,046 B.t.u.

1 A piece of board 38 inches long was cut from a board 72 inches long. What is the length of the remaining piece? _____

2. How many square feet of plywood remain from an original supply of 10,000 square feet after 6,973 square feet have been used? _____

3. It was necessary to use 6,493 bricks from a pile containing 8,640. How many bricks were left? _____

4. A basement floor space containing 14,650 sq. ft. How much space remains to be painted after 6,842 sq. ft. have been covered? _____

5. A contract for excavating called for the removal of 40,000 cu. yds. of earth. How much remained after removing 7,643 cu. yds? _____

6. A lumber man had 632,000 bd. ft. (board feet) of native pine. If he sold 328,582 bd. ft., how many bd. ft. remained? _____

7. A carpenter built a veranda by contract for $450.00. His material, labor and other costs totaled $365.00. What was his profit? _____

8. A contractor bought 6,000 bd. ft. of oak flooring. He used 1,928 bd. ft. on the one house and 1,850 bd. ft. on another. How much flooring had he left? _____

9. The balance in a contractor's checking account in a certain bank is $1,176.00. If he withdraws $321.00, what will his balance be? _____

NEW PROBLEMS

1. A machinist had 4763 feet of 1" stock. After using 2895 feet, how much remained?

2. In ten years the number of factory workers in a city increased from 31,467 to 257,289. What was the increase?

3. A man's pay before deductions was $93.00. His deductions were insurance $7.00, dues $3.00, social security $4.00, and taxes $18.00. What was his take-home pay?

4. Four pieces measuring 49 inches, 72 inches, 27 inches and 36 inches are cut from a steel bar that was 192 inches long. Allowing a total of 1" for waste in cutting, what is the length of the piece remaining?

5. Which is larger, the sum of 239, 473, 892, 652 and 378, or the sum of 972, 643, 179, 233 and 462, and by how much?

6. There were 275 gallons of cutting oil in a tank. The first week 45 gallons were used, the second week 38 gallons, the third week 29 gallons and the fourth week 24 gallons. How much oil had to be ordered to fill the tank?

7. Taxes on a group of factory buildings amounted to $1,973,462. Taxes for the same group three years later amounted to $3,456,231. Find the increase.

8. A machinist had $6748 with which to build a shop. The garage cost $1789, the land cost $1500, the building $5690 and other expenses amounted to $363. How much money must he have borrowed to complete the building?

9. A contractor paid $3640 for a new truck. He had $9647 in the bank. What was his bank balance after he paid for the truck?

ACTIVITY #3

Multiply the following quantities:

1. 16 inches
   X 44

2. 56 feet
   X 17

3. 254 Sq. inches
   X 16

4. 352 sq. feet
   X 75

5. 1,809 cu. inches
   X 62

6. 2,834 sq. yards
   X 170

7. 659 cu. yards
   X 212

8. 350 hours
   X 521

9. $1,205
   X 57

10. 1,872 cu. inches
    X 109

11. 1,257 gallons
    X 857

12. $16,005
    X 77

ACTIVITY #2

1. 120 inches
-43 inches

2. 1,473 feet
- 611 feet

3. 909 yards
-640 yards

4. 1,636 sq. in.
- 703 sq. in.

5. 2,469 sq. ft.
- 983 sq. ft.

6. 3,091 sq. yds.
- 993 sq. yds.

7. 12,643 cu. yds.
-7,123 cu. yds.

8. 16,298 lbs.
-3,696 lbs.

9. 23,122 cu. ft.
-10,069 cu. ft.

10. $14,254.00
-9,676.00

11. 55,864 B.t.u.
-34,964 B.t.u.

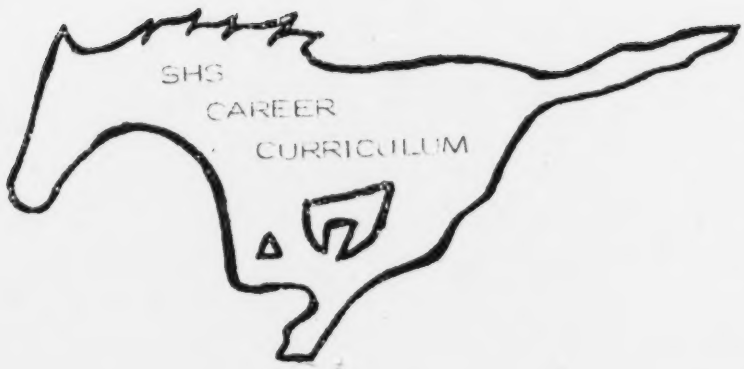
12. $25,150.00
-11,909.00

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: COMPLICATIONS HAVE DONE SET IN

by

H. Burton Tingle

RATIONALE

You already know now to work with some kinds of fractions because of your knowledge of arithmetic. Now there are some fractions with polynomials in them that we need to be able to work with. They behave very much like ordinary arithmetic fractions and are another part of the algebraic process that can be better used the more you know about them.

In this package, you will be studying algebraic fractions.

BEHAVIORAL OBJECTIVES

1. Given any set of algebraic fractions you should be able to reduce them to lowest terms with 90% accuracy.
2. Given any set of algebraic fractions, you should be able to add, subtract, multiply or divide them with 80% accuracy.

PRE-TEST

Give each answer in simplest terms.

1. $\frac{10abc}{2ab}$

2. $\frac{5abc}{10a^2b^2}$

3. $\frac{ax - ab}{x^2 - b^2}$

4. $\frac{x^2 + 3x - 18}{x^2 - 6x + 9}$

5. $\frac{5abc}{2mn} \times \frac{10mn^2}{5b^2}$

6. $\frac{12abc}{5xyz} \div \frac{3ac^2}{10yz^2}$

7. $\frac{12ab}{5} + \frac{6ab}{10}$

8. $\frac{5}{2x} + \frac{3}{4x^2}$

9. $\frac{5a^2b}{2rs} \times \frac{10s^2}{ab} \div \frac{2ab}{20r}$

10. $\frac{x^2 + 7x + 10}{x^2 + 7x + 12} \times \frac{x^2 + 5x + 4}{x^2 - 4}$

11. $\dfrac{\frac{2}{a + 1} + \frac{a - 1}{a + 1}}{3 + \frac{a}{a + 1}}$

12. $\dfrac{\frac{2}{3 + x} - \frac{x}{3 - x}}{x - 3 + \frac{1}{x - 3}}$

13. $\frac{2x}{a^2b^2} - \frac{5x}{a^4 - a^2b^2}$

14. $\frac{2x}{x^2 + 3x - 10} + \frac{3}{x^2 + 6x + 5} + \frac{x}{x^2 - x - 2}$

You must get 13 correct to skip over this package.

INFORMATION SOURCES

1. Listen to the teacher presentation
2. Read Chapter 8 in the textbook

ACTIVITY I

Reduce each of these fractions to lowest terms.

1. $\frac{5\ x\ y\ z}{x\ y}$

2. $\frac{7\ x^2\ y^2}{2\ x\ y}$

3. $\frac{10\ a^2\ b}{5\ a\ b^2}$

4. $\frac{6\ a\ b\ c}{12\ a\ b\ c}$

5. $\frac{14\ a^2\ b^2\ c^2}{10\ a^3\ b\ c}$

6. $\frac{.2\ x^2}{5\ x}$

7. $\frac{.8\ a\ b\ c^2}{.10\ a^2\ b\ c}$

8. $\frac{\frac{1}{2}\ x\ y\ t}{\frac{1}{3}\ x^2\ t\ y}$

9. $\frac{.8\ x^2\ y^2\ z^2}{8\ x^2\ y^2\ z}$

10. $\frac{16\ a\ b\ c\ d}{4\ a^2\ b^2\ c\ d}$

ACTIVITY 2

Reduce each of the following to lowest terms.

1. $\frac{3x^2 + 2x}{x}$

2. $\frac{4x + 2}{2}$

3. $\frac{5x^3 + 10x^2 + 15x}{5x}$

4. $\frac{2x^4 + 4x^5 + 8x}{2x^2}$

5. $\frac{3x^2 + 9x^3}{3x}$

6. $\frac{4a^2 + 5ab}{2ab}$

7. $\frac{10rs + 5rs^2}{5r^2s}$

8. $\frac{2m^2 + 4m + 6m^3}{2m^4}$

9. $\frac{3a^2 - 4a}{2}$

10. $\frac{x^2 + 3x - 4}{x - 1}$

11. $\frac{x^2 - 5x + 4}{x - 4}$

12. $\frac{x^2 + 7x + 12}{x + 3}$

13. $\frac{x^2 - 2x - 15}{x - 5}$

14. $\frac{x^2 - 16}{x + 4}$

15. $\frac{x^2 - 25}{x^2 - x - 20}$

16. $\frac{x^2 - 4x - 21}{x^2 - 5x - 14}$

17. $\frac{2x^2 - 5x + 3}{2x^2 - x - 3}$

18. $\frac{6x^2 - x - 2}{3x^2 + 7x - 6}$

ACTIVITY #3

Give each answer in simplest terms.

1. $\frac{2}{3} \times \frac{5}{7} =$

2. $\frac{3}{8} \times \frac{9}{10} =$

3. $\frac{4}{5} \times \frac{2}{3} =$

4. $\frac{6}{7} \times \frac{3}{5} \times 2 =$

5. $\frac{1}{2} \times \frac{3}{4} \times \frac{1}{7} =$

6. $\frac{1}{2} \times \frac{2}{3} \times \frac{6}{7} =$

7. $\frac{3}{4} \times \frac{6}{7} \times \frac{14}{15} =$

8. $\frac{9}{10} \times \frac{10}{5} \times \frac{2}{3} =$

9. $\frac{26}{45} \times \frac{9}{13} \times \frac{15}{16} =$

10. $\frac{110}{91} \times \frac{27}{44} \times \frac{77}{50} =$

ACTIVITY#4

Work p. 293,294: 1 - 45

ACTIVITY 5

1. $\frac{1}{2} \div \frac{2}{3} =$

2. $\frac{3}{4} \div \frac{1}{5} =$

3. $\frac{1}{2} \div 4 =$

4. $3 \div \frac{1}{4} =$

5. $\frac{3}{5} \div \frac{2}{3} =$

6. $\frac{3}{7} \div \frac{9}{10} =$

7. $\frac{3}{10} \div \frac{3}{5} =$

8. $2 \div \frac{1}{4} =$

9. $2 \div \frac{2}{3} =$

10. $\frac{4}{15} \div \frac{2}{3} =$

ACTIVITY 6

Work p. 295, 296: 1 - 29

ACTIVITY 7

Work p. 296.297: 1 - 20

ACTIVITY 8

Work p. 298, 299: 1 - 20

ACTIVITY 9

Give each answer in simplest terms.

1. $\frac{1}{2} + \frac{1}{3}$

2. $\frac{3}{4} + \frac{5}{7}$

3. $\frac{3}{5} - \frac{1}{6}$

4. $\frac{2}{3} + \frac{1}{8} - \frac{2}{9}$

5. $\frac{1}{11} + \frac{2}{3} - \frac{1}{4}$

6. $\frac{1}{30} + \frac{1}{18}$

7. $\frac{9}{10} - \frac{3}{45}$

8. $\frac{7}{88} + \frac{9}{100}$

9. $\frac{3}{50} - \frac{1}{64} + \frac{2}{75}$

10. $\frac{3}{65} + \frac{1}{100} - \frac{1}{90}$

ACTIVITY 10

Work p. 301, 302: 1 - 38

ACTIVITY 11

Change each mixed number to an improper fraction and each improper fraction to a mixed number.

1. $2\frac{1}{2}$

2. $3\frac{2}{3}$

3. $5\frac{6}{7}$

4. $12\frac{2}{11}$

5. $45\frac{23}{25}$

6. $\frac{7}{3}$

7. $\frac{9}{4}$

8. $\frac{5}{4}$

9. $\frac{22}{3}$

10. $\frac{373}{19}$

ACTIVITY 12

Work p. 303: 1 - 24

ACTIVITY 13

Work p. 305: 1 - 27

ACTIVITY 14

Work p. 307: 1 - 25

ACTIVITY 15

Work p. 309: 1 - 15

People who work in what occupations would normally be concerned with interest problems.

ACTIVITY 16

Work p. 311: 1 - 10

People who work with mixtures and solutions need to have a knowledge of _____, in addition to algebra.

What kinds of occupations could they work in?

ACTIVITY 17: Work p. 315, 316: 1 - 13

ACTIVITY 18: Work p. 318: 1 - 8

ACTIVITY 19: Read p. 320, p. 331

What is a home economist?

Name three different occupations that a home economist could work in.

Why did Lilivati have her name in an ancient algebra book?

QUEST

Work with the divisibility properties of integers on pages 328, 329, and 330.

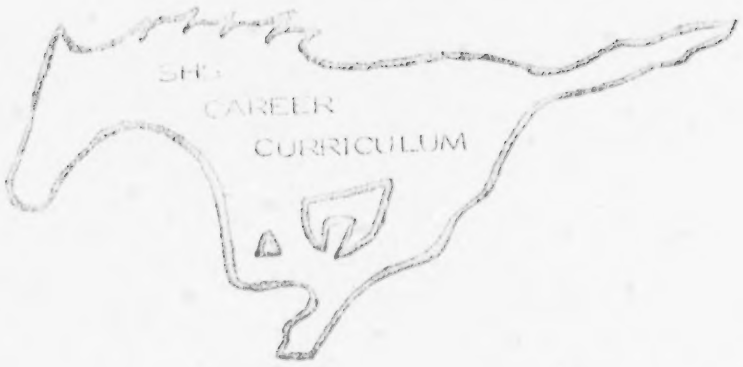
Check these numbers for divisibility by: (answer yes or no)	3	4	5	6	7	9	11
62,681,734,219	—	—	—	—	—	—	—
820,019,131	—	—	—	—	—	—	—
45,678,912	—	—	—	—	—	—	—
625,518	—	—	—	—	—	—	—
843	—	—	—	—	—	—	—

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT



COURSE TITLE: ALGEBRA

PACKAGE TITLE: THAT AIN'T NATURAL

by

H. Burton Tingle

RATIONALE

You already know how to work with whole numbers, both positive and negative; and with fractions. Now there are some numbers called irrational numbers that you need to be able to work with. Sometimes, they are called radical numbers, or just radicals. Together with the integers, they make up a set of numbers called the real number system. They are a necessity for solving second degree sequations.

In this package, you will be working with real numbers.

BEHAVIORAL OBJECTIVES

1. Given any set of real numbers, you should be able to express them in simplest radical form with 80 % accuracy.

2. Given any set of real numbers, you should be able to add, subtract, multiply and divide them; and give the answer in simplest terms with 80 % accuracy.

PRE-TEST

Give each answer in simplest terms.

1. $\sqrt{64}$

2. $\sqrt{48}$

3. $\sqrt{4080}$

4. $\sqrt{6050}$

5. $\sqrt{2} \times \sqrt{10}$

6. $\sqrt{20} \times \sqrt{15}$

7. $3\sqrt{5} - 8\sqrt{5}$

8. $\sqrt{12} + \sqrt{27}$

9. $\sqrt{\frac{3}{5}}$

10. $\sqrt{\frac{9}{8}}$

11. $\frac{\sqrt{5}}{\sqrt{6}}$

12. $(\sqrt{8} + \sqrt{2})(\sqrt{6} + \sqrt{3})$

13. $(\sqrt{5} - \sqrt{2})^2$

14. $\frac{\sqrt{6} + \sqrt{3}}{\sqrt{2} + \sqrt{5}}$

15. $\frac{\sqrt{10} + 2\sqrt{3}}{\sqrt{5} - \sqrt{8}}$

You must get 14 correct to skip over this package

INFORMATION SOURCES

1. Listen to the teacher presentation

2. Read Chapter 11 in the textbook

3. Memorize the following rules

   A. Definition of root: $\sqrt[n]{x} = b$ iff $b^n = x$

   B. First law of radicals: $\sqrt[n]{xy} = \sqrt[n]{x}\sqrt[n]{y}$

   C. Second law of radicals: $\sqrt[n]{\frac{x}{y}} = \frac{\sqrt[n]{x}}{\sqrt[n]{y}}$

   D. Agreement #1: Never leave a fraction under a radical sign

   E. Agreement #2: Never leave a radical sign in the denominator of a fraction

ACTIVITY

Square each of these numbers

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. 11
12. 12
13. 13
14. 14
15. 15
16. .7
17. .09
18. .1
19. .06
20. .11
21. .3
22. .002
23. .12
24. 1.3
25. 2.2
26. $\frac{1}{2}$
27. $\frac{3}{4}$
28. $\frac{2}{3}$
29. $\frac{9}{16}$
30. $2\frac{3}{4}$

ACTIVITY

Give the square root of each of these numbers.

1. $\sqrt{4}$
2. $\sqrt{9}$
3. $\sqrt{25}$
4. $\sqrt{36}$
5. $\sqrt{64}$
6. $\sqrt{81}$
7. $\sqrt{49}$
8. $\sqrt{1}$
9. $\sqrt{16}$
10. $\sqrt{100}$
11. $\sqrt{121}$
12. $\sqrt{169}$
13. $\sqrt{225}$
14. $\sqrt{400}$
15. $\sqrt{625}$
16. $\sqrt{.01}$
17. $\sqrt{.0081}$
18. $\sqrt{.49}$
19. $\sqrt{.04}$
20. $\sqrt{.0009}$
21. $\sqrt{.16}$
22. $\sqrt{.000004}$
23. $\sqrt{.0025}$
24. $\sqrt{\frac{4}{9}}$
25. $\sqrt{\frac{16}{81}}$
26. $\sqrt{\frac{9}{16}}$
27. $\sqrt{\frac{25}{49}}$
28. $\sqrt{\frac{1}{4}}$
29. $\sqrt{\frac{1}{100}}$
30. $\sqrt{\frac{49}{10,000}}$

ACTIVITY

Express each of the following in simplest radical form.

1. $\sqrt{8}$
2. $\sqrt{12}$
3. $\sqrt{20}$
4. $\sqrt{24}$
5. $\sqrt{28}$
6. $\sqrt{40}$
7. $\sqrt{44}$
8. $\sqrt{52}$
9. $\sqrt{60}$
10. $\sqrt{18}$
11. $\sqrt{27}$
12. $\sqrt{45}$
13. $\sqrt{54}$
14. $\sqrt{63}$
15. $\sqrt{90}$
16. $\sqrt{32}$
17. $\sqrt{80}$
18. $\sqrt{48}$
19. $\sqrt{50}$
20. $\sqrt{72}$
21. $\sqrt{108}$
22. $\sqrt{120}$
23. $\sqrt{75}$
24. $\sqrt{140}$
25. $\sqrt{99}$
26. $\sqrt{88}$
27. $\sqrt{150}$
28. $\sqrt{125}$
29. $\sqrt{136}$
30. $\sqrt{98}$

ACTIVITY

Multiply, and give each answer in simplest terms.

1. $\sqrt{3} \times \sqrt{3}$
2. $\sqrt{2} \times \sqrt{3}$
3. $\sqrt{4} \times \sqrt{3}$
4. $\sqrt{6} \times \sqrt{2}$
5. $\sqrt{7} \times \sqrt{2}$
6. $\sqrt{8} \times \sqrt{2}$
7. $\sqrt{12} \times \sqrt{3}$
8. $\sqrt{10} \times \sqrt{2}$
9. $\sqrt{60} \times \sqrt{2}$
10. $\sqrt{30} \times \sqrt{3}$
11. $\sqrt{x} \times \sqrt{x}$
12. $\sqrt{2x} \times \sqrt{3x}$
13. $\sqrt{5x^2} \times \sqrt{5x}$
14. $\sqrt{12a^3} \times 3\sqrt{3a}$
15. $x\sqrt{5x} \times y\sqrt{2x}$
16. $2(2 + \sqrt{3})$
17. $3(4 - \sqrt{2})$
18. $\sqrt{2}(2 + \sqrt{3})$
19. $\sqrt{3}(4 - \sqrt{2})$
20. $\sqrt{10}(\sqrt{2} + \sqrt{5})$
21. $(2 + \sqrt{3})(3 - \sqrt{5})$
22. $(1 - \sqrt{2})(3 - \sqrt{3})$
23. $(\sqrt{2} + \sqrt{3})(\sqrt{5} - \sqrt{6})$
24. $(\sqrt{7} + \sqrt{3})(\sqrt{7} - \sqrt{3})$
25. $(\sqrt{5} + \sqrt{11})^2$
26. $x(\sqrt{x} + \sqrt{y})$
27. $3a(\sqrt{2a^2} + \sqrt{4a})$
28. $\sqrt{xy}(\sqrt{xy} - \sqrt{x^2y^2})$
29. $(3 + x)(\sqrt{x} + \sqrt{3})$
30. $(\sqrt{a} + \sqrt{b})(\sqrt{c} + \sqrt{d})$

ACTIVITY

Rationalize the denominators on each of these problems.

1. $\frac{1}{\sqrt{3}}$

2. $\frac{1}{\sqrt{2}}$

3. $\frac{3}{\sqrt{3}}$

4. $\frac{5}{\sqrt{5}}$

5. $\frac{3}{\sqrt{6}}$

6. $\frac{7}{\sqrt{8}}$

7. $\frac{\sqrt{2}}{\sqrt{3}}$

8. $\frac{\sqrt{5}}{\sqrt{10}}$

9. $\frac{\sqrt{6}}{\sqrt{12}}$

10. $\frac{\sqrt{3}}{\sqrt{15}}$

11. $\frac{\sqrt{5}}{\sqrt{20}}$

12. $\frac{1}{1 + \sqrt{2}}$

13. $\frac{2}{3 - \sqrt{5}}$

14. $\frac{3}{6 + \sqrt{3}}$

15. $\frac{\sqrt{3}}{\sqrt{3} - \sqrt{2}}$

16. $\frac{\sqrt{2} - \sqrt{3}}{\sqrt{3} + \sqrt{5}}$

17. $\frac{\sqrt{12} - \sqrt{27}}{\sqrt{3} - \sqrt{6}}$

18. $\frac{\sqrt{x} - \sqrt{y}}{a\sqrt{b} - \sqrt{d}}$

ACTIVITY

Work p. 405: 1 - 12

ACTIVITY

Work p. 415: 1 - 54

ACTIVITY

work p. 419: 1 - 26

ACTIVITY

Work p. 420: 1 - 20

ACTIVITY

Read P. 424, p. 433

1. What are some of the problems facing civic planners of today

2. Draw a sketch of what you would think is the ideal layout of a city of 100,000 people.

QUEST

Express each answer in simplest terms.

1. $\sqrt{8}$

2. $\sqrt[4]{32}$

3. $\sqrt[3]{27x^4}$

4. $\sqrt{120x^8}$

5. $\sqrt{4x} \times \sqrt[3]{2x}$

6. $(\sqrt[4]{2x})^5$

7. $\frac{2}{\sqrt[3]{3}}$

8. $\frac{\sqrt{2}}{\sqrt[3]{3}}$

9. $\frac{\sqrt[4]{3x^5}}{\sqrt[4]{2x^2}}$

10. $\frac{1}{\sqrt[3]{3} + \sqrt{2}}$

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT

COURSE TITLE: ALGEBRA

PACKAGE TITLE: NOW THERE'S TWO OF 'EM

by

H. Burton Tingle

RATIONALE

So far, we have solved linear or first degree equations. If the variable is squared, it becomes a second degree equation. Many times problems appear with the variable squared. This means, according to the fundamental theorem of algebra, that it has 2 solutions. Finding those 2 solutions is the work of this package.

BEHAVIORAL OBJECTIVES

1. Given any quadratic equation with rational coefficients, you should be able to find the solutions with 80% accuracy.

Pre-Evaluation

Find the solutions to each of these quadratic equations.

1. $x^2 - 9 = 0$

2. $x^2 - 4 = 0$

3. $x^2 + 6x + 9 = 0$

4. $x^2 + 2x + 1 = 0$

5. $x^2 - 4x - 5 = 0$

6. $x^2 + 2x - 15 = 0$

7. $2x^2 + x - 6 = 0$

8. $2x^2 + 5x - 1 = 0$

9. $4x^2 = 2x + 3$

10. $\frac{3x^2}{2} + 4x = .3$

You must get 9 correct to skip over this package.

INFORMATION SOURCES

1. Listen to the teacher presentation
2. Read Chapter 13 in the textbook

Find the solutions to these quadratic equations by factoring.

1. $x^2 - 16 = 0$
2. $x^2 - 25 = 0$
3. $2x^2 - 2 = 0$
4. $x^2 - 64 = 0$
5. $x^2 - 81 = 0$
6. $3x^2 - 300 = 0$
7. $x^2 = 36$
8. $x^2 + 4x + 4 = 0$
9. $x^2 + 10x + 25 = 0$
10. $x^2 - 12x - 36 = 0$
11. $x^2 - 20x + 100 = 0$
12. $x^2 + 18x = -81$
13. $x^2 + 16x + 64 = 0$
14. $x^2 + 24x + 144 = 0$
15. $4x^2 - 9 = 0$
16. $9x^2 = 1$
17. $9x^2 - 4 = 0$
18. $16x^2 - 9 = 0$
19. $25x^2 = 4$
20. $16x^2 - 25 = 0$
21. $81x^2 = 1$
22. $4x^2 + 12x + 9 = 0$
23. $9x^2 - 30x + 25 = 0$
24. $16x^2 - 8x + 1 = 0$
25. $25x^2 + 20x + 4 = 0$
26. $25x^2 + 60x + 36 = 0$
27. $9x^2 - 12x + 4 = 0$
28. $4x^2 + 40x + 100 = 0$

Find the solutions to these quadratic equations by factoring. Show all work.

1. $x^2 - 7x + 12 = 0$

2. $x^2 - 8x + 15 = 0$

3. $x^2 - 11x + 24 = 0$

4. $x^2 - 10x + 16 = 0$

5. $x^2 - 8x + 12 = 0$

6. $x^2 - 5x = -4$

7. $x^2 - 6x + 8 = 0$

8. $2x^2 - 15x + 18 = 0$

9. $3x^2 - 11x = -10$

10. $4x^2 - 8x + 3 = 0$

11. $x^2 + 8x + 12 = 0$

12. $x^2 + 7x + 10 = 0$

13. $x^2 + 5x + 4 = 0$

14. $x^2 + 11x = -18$

15. $x^2 + 5x + 6 = 0$

16. $x^2 + 9x + 20 = 0$

17. $x^2 + 10x + 24 = 0$

18. $x^2 + 14x + 24 = 0$

19. $2x^2 + 7x + 6 = 0$

20. $5x^2 + 8x + 3 = 0$

21. $x^2 + 2x - 15 = 0$

22. $x^2 - 3x - 10 = 0$

23. $x^2 - 7x - 18 = 0$

24. $x^2 - 5x - 24 = 0$

25. $2x^2 - x - 6 = 0$

26. $3x^2 + 5x - 12 = 0$

Find the solutions to these quadratic equations by completing the square. Show all work.

1. $x^2 + 6x = 7$

2. $x^2 + 8x = -7$

3. $x^2 - 2x = 3$

4. $x^2 + 4x = 5$

5. $x^2 + 10x = -9$

6. $x^2 - 12x = 13$

7. $x^2 + 3x = 2$

8. $x^2 - 5x = 2\frac{3}{4}$

9. $x^2 + x = \frac{3}{4}$

10. $x^2 + 7x = \frac{15}{4}$

11. $x^2 + 4x = 6$

12. $x^2 + 6x = 10$

13. $x^2 + 2x = 0$

14. $x^2 + 8x = 14$

Solve these quadratic equations by completing the square. Show all work.

1. $2x^2 + 4x - 10 = 0$

2. $3x^2 + 6x - 18 = 0$

3. $2x^2 + 8x - 10 = 0$

4. $4x^2 + 8x - 4 = 0$

5. $3x^2 - 9x - 12 = 0$

6. $5x^2 - 15x = 20$

7. $5x^2 - 10x - 6 = 0$

8. $2x^2 - 6x - 7 = 0$

9. $3x^2 - 12x = 1$

10. $2x^2 - 2x = 5$

11. $6x^2 - 12x = 1$

12. $10x^2 + 30x = 5$

13. $2x^2 + 3x = 2$

14. $3x^2 - 4x = 1$

15. $5x^2 - x - 2 = 0$

16. $4x^2 - 6x - 6 = 0$

17. $7x^2 - 8x = 14$

18. $2x^2 - 17x + 1 = 0$

Solve these equations by the quadratic formula. Show all work and leave answers in simplest possible terms.

1. $x^2 + 4x + 4 = 0$

2. $x^2 - 12x + 36 = 0$

3. $x^2 + 10x + 25 = 0$

4. $x^2 - 20x + 100 = 0$

5. $4x^2 + 12x + 9 = 0$

6. $x^2 - 11x + 24 = 0$

7. $x^2 - 7x + 12 = 0$

8. $x^2 - 5x = -4$

9. $x^2 - 10x + 16 = 0$

10. $2x^2 - 15x = -18$

11. $4x^2 - 8x + 3 = 0$

12. $x^2 + 7x + 10 = 0$

13. $x^2 + 5x + 4 = 0$

14. $x^2 + 11x = -18$

15. $x^2 + 5x + 6 = 0$

16. $x^2 + 9x + 20 = 0$

17. $x^2 + 10x + 24 = 0$

18. $x^2 + 2x - 15 = 0$

19. $x^2 - 7x - 18 = 0$

20. $x^2 - 3x - 10 = 0$

21. $2x^2 - x - 6 = 0$

22. $3x^2 + 5x = 12$

23. $x^2 - 5x = 24$

24. $x^2 - 4x - 12 = 0$

25. $3x^2 - 11x = -10$

26. $5x^2 - x = 2$

27. $2x^2 - 6x - 7 = 0$

28. $2x^2 + 3x - 2 = 0$

29. $3x^2 + 5x - 1 = 0$

30. $4x^2 - 7x - 4 = 0$

ACTIVITY

Read p.

What is an actuary?

What branches of mathematics do actuaries use most for their calculations?

Who do actuaries usually work for?

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT

COURSE TITLE: ALGEBRA

PACKAGE TITLE: WE GOTTA FIND THAT TRAIL

by

H. Burton Tingle

RATIONALE

Graphing has many different practical applications, depending upon the type of graph.

Graphing of lines and other curves and finding where they cross each other is of particular interest in surveying, missle trajectories, and many other areas.

Also, there are many properties of lines and curves which can be seen from graphs.

In this package, you will be graphing points and lines.

BEHAVIORAL OBJECTIVES

1. Given any set of points, you should be able to graph them on a rectangular coordinate system with 90% accuracy.

2. Given any set of equations of lines in two dimensions, you should be able to graph them with 90% accuracy

3. Given any set of equations of lines in two dimensions, you should be able to identify the slope and the y-intercept with 80% accuracy.

PRE-TEST

On the given axes below, graph each of these points and label them.

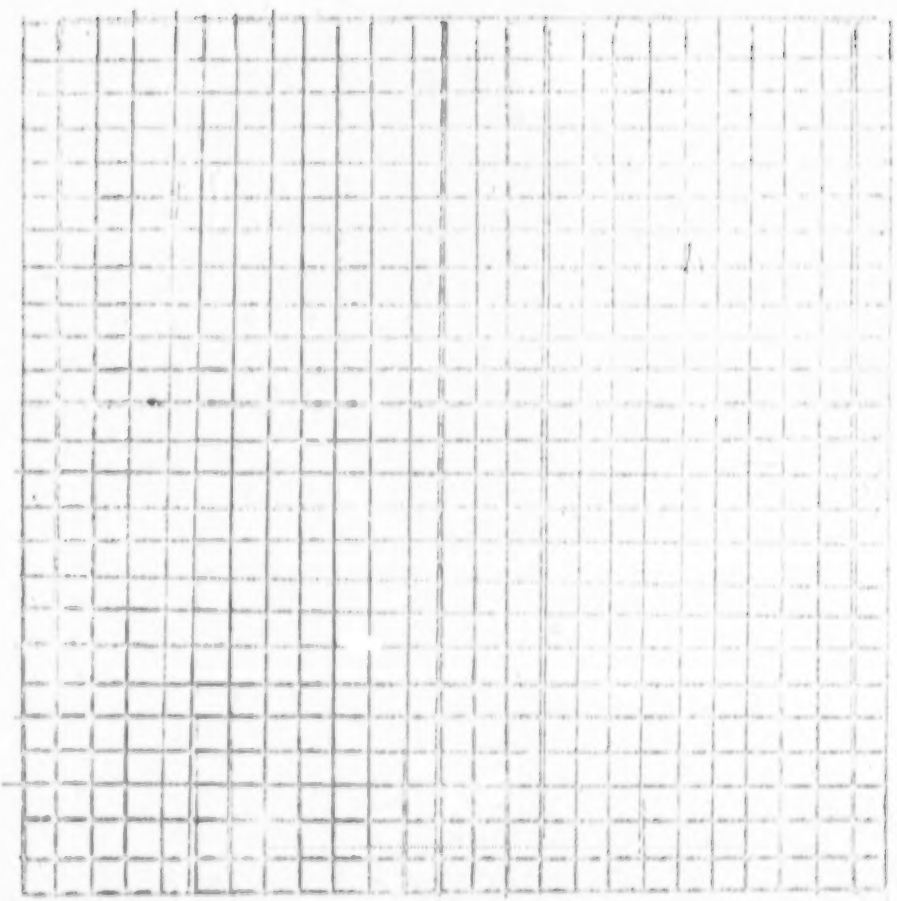
A. (3,4) B. (-2,-4) C. (3,-1) D. (-2,1)

E. (0,-4) F. (3,0) G. (0,5) H. (-2,0)

Give at least two points that lie on each of these lines.

1. $2x - y + 1 = 0$

2. $\frac{3x}{2} + 2y - 3 = 0$



1. PRE-TEST continued

Graph each of these lines on the axes below and label them.

1. $x + y = 0$

2. $x - y = 0$

3. $x - 2y - 2 = 0$

4. $4x - y - 2 = 0$

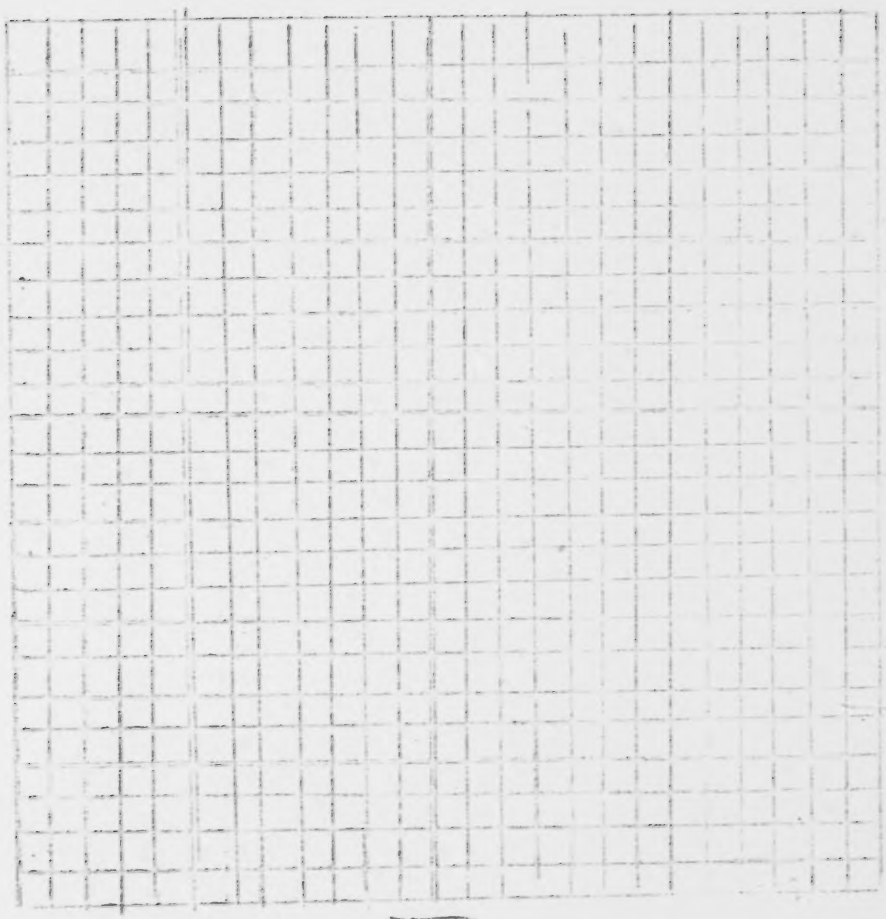
5. $x - y + 2 = 0$

6. $\frac{x}{3} + 2y + 4 = 0$

Give the slope and y-intercept of each of these lines.

7. $3x - 4y + 2 = 0$ ____ ____

8. $\frac{x}{2} + \frac{y}{3} - 3 = 0$ ____ ____



III

INFORMATION SOURCES

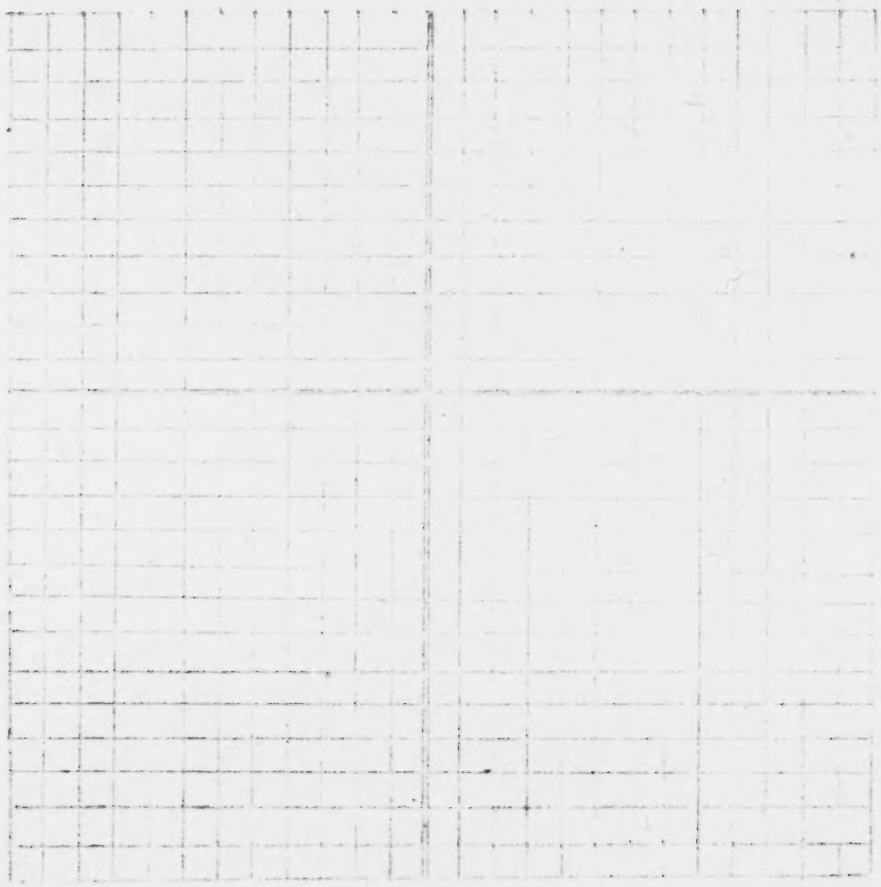
1. Listen to the teacher presentation
2. Read Chapter 9 in the textbook

IV

G-1 Activity

On the given set of coordinate axes, graph each of the following points and label it properly.

1. (3,4)
2. (2,5)
3. (7,1)
4. (2,-5)
5. (2,-2)
6. (5,-8)
7. (-3,4)
8. (-5,6)
9. (-10,1)
10. (-2,4)
11. (-8,-4)
12. (-1,-2)
13. (-4,-5)
14. (-3,-10)
15. (0,-2)
16. (2,0)
17. (0,2)
18. (-2,0)
19. (0,0)
20. (0,7)



ACTIVITY

Graph each of the following points, and join them with segments in the order given.

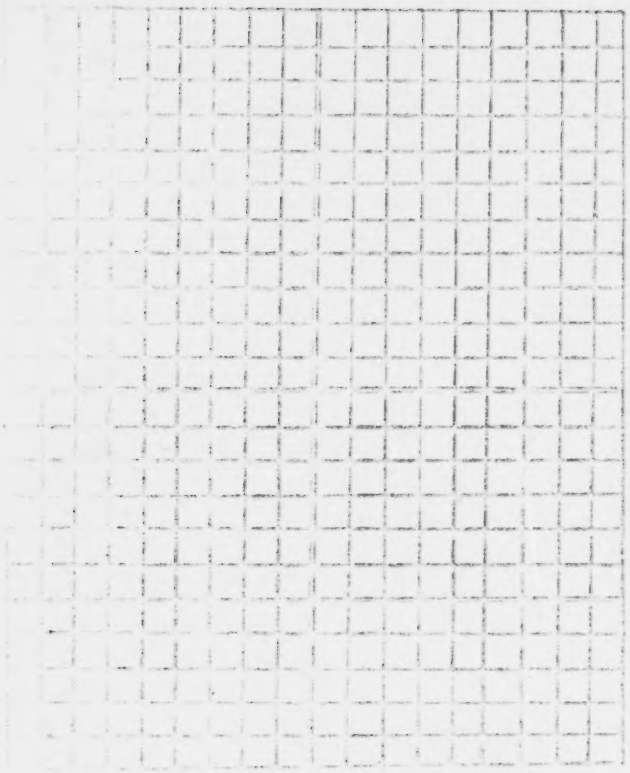
1. (3,-4)	10. (-5,13)	19. (-11,1)
2. (6,-4)	11. (-6,11)	20. (-7,-5)
3. (8,-2)	12. (-3,12)	21. (-10,-8)
4. (10,5)	13. (-2,12)	22. (-2,-3)
5. (8,4)	14. (-3,11)	23. (5,-6)
6. (6,7)	15. (-3,12)	24. (12,-1)
7. (-6,2)	16. (-6,11)	25. (19,-6)
8. (0,10)	17. (-10,11)	
9. (-1,13)	18. (-2,9)	

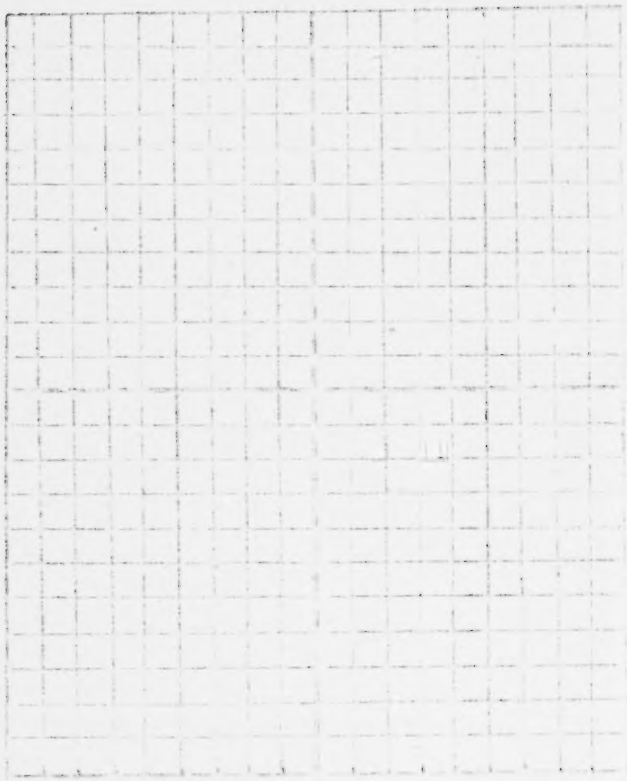
VI

ACTIVITY

As you know, two points determine exactly one line. For each of the pairs of points below graph the only line through them.

1. (1,2); (3,4)
2. (2,6); (5,1)
3. (3,1); (2,0)
4. (1,1); (4,4)
5. (0,4); (6,5)
6. (6,-2); (-3,4)
7. (3,-1); (-2,0)
8. (-2,-2); (4,-1)
9. (-2,-1); (-3,-2)
10. (-4,3); (0,-2)





If the slope of a line is defined to be the rise of the line divided by the run of the line, give the slope of each of the lines you have graphed.

1.____ 2.____ 3.____ 4.____ 5.____ 6.____ 7.____ 8.____

9.____ 10.____

ACTIVITY

Each of the equations below is called a linear equation because its graph is a line.
By substitution, find some points on each line and graph it accurately.

1. $x + y - 2 = 0$

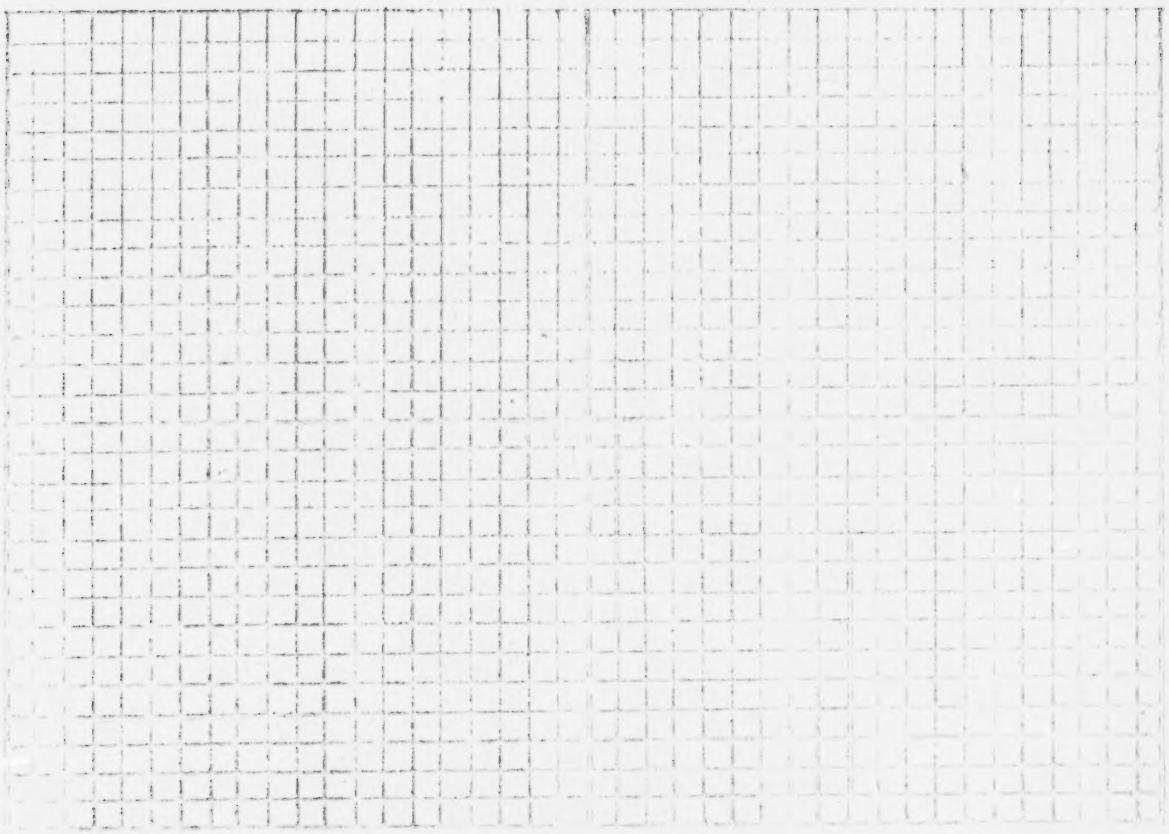
2. $2x - y + 1 = 0$

3. $4x + 2y = 5$

4. $x - y = 0$

5. $\frac{x}{2} + y = 4$

6. $\frac{x}{2} + \frac{2y}{3} = 1$



ACTIVITY

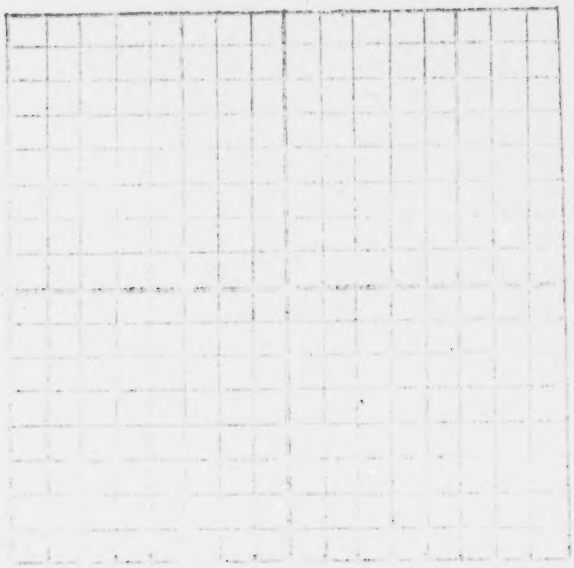
By substitution, find some points on each of these lines, and graph them carefully.

1. $x - y - 3 = 0$

2. $2x + y + 2 = 0$

3. $2x - 4y - 4 = 0$

4. $3x + 5y + 10 = 0$



From the above graphs, what is the slope of line 1? _____

of line 2? _____

of line 3? _____

of line 4? _____

Where do the above lines cross the y-axis? Line 1 _____

Line 2 _____

Line 3 _____

Line 4 _____

ACTIVITY

Solve each of the following equations for y.

1. $x - y - 3 = 0$

2. $2x + y + 2 = 0$

3. $3x - 4y - 4 = 0$

4. $3x + 5y + 10 = 0$

Compare the above answers to the last two problems on the previous page!!!!

Determine the slope and y intercept of each of the following lines, without graphing.

5. $2x - 3y - 3 = 0$

6. $4x + 2y + 1 = 0$

7. $5x - 8y + 2 = 0$

8. $4x - y - 2 = 0$

9. $7x - 3y = 0$

10. $\frac{5x}{3} - \frac{y}{2} = 1$

11. $\frac{3x}{4} + \frac{y}{3} = 2$

X

ACTIVITY

Graph each pair of lines and find out where they cross each other.

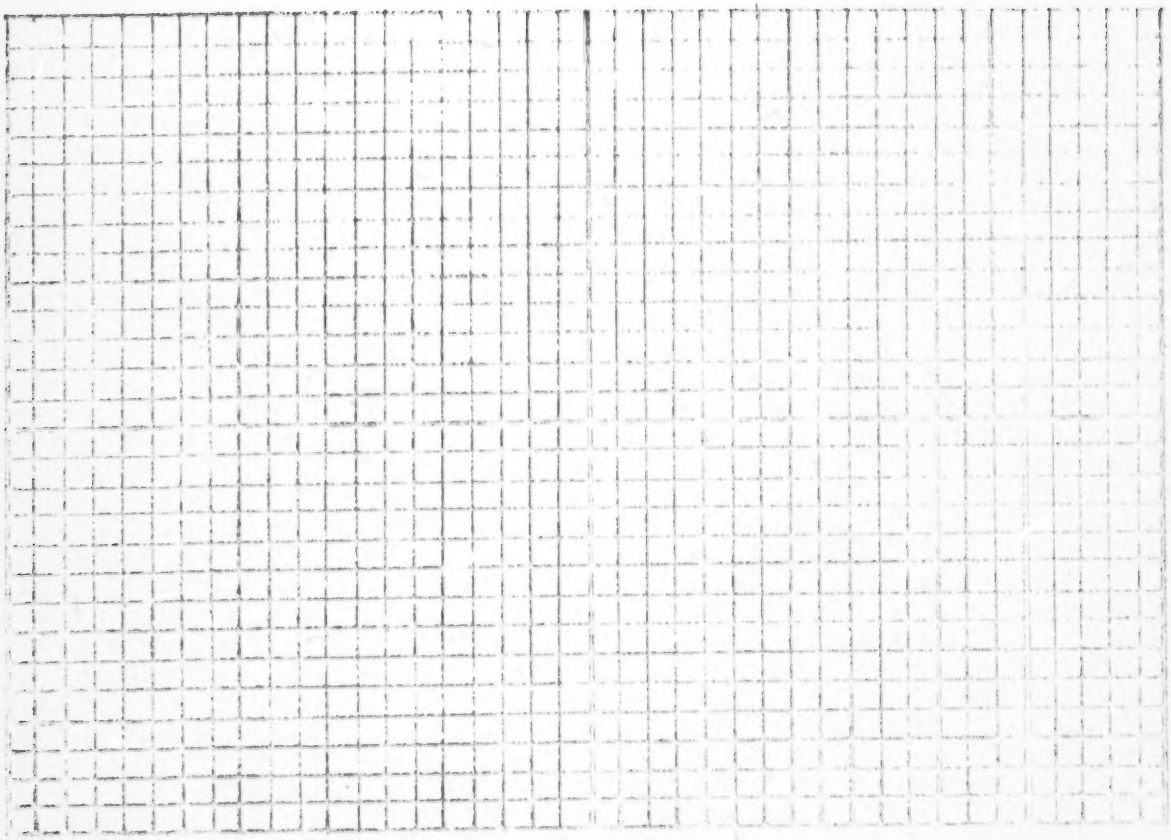
1. $x = y$ and $2x + y - 3 = 0$ _____

2. $2x = y$ and $y + 3x - 5 = 0$ _____

3. $x = 2y$ and $x - 3y + 1 = 0$ _____

4. $x + y = 1$ and $2x + y = 3$ _____

5. $2x - y + 4 = 0$ and $x + 2y = -7$ _____



ACTIVITY

Read p. 365

What was Rene' Descartes occupation before he devoted his life to studying and learning?

Read p. 333

What is a cardiogram

People in what occupation design and build cardiographs?

People in what occupations would be most likely to use cardiograms?

XII

SAHUARITA HIGH SCHOOL

CAREER

CURRICULUM

PROJECT

COURSE TITLE: ALGEBRA

PACKAGE TITLE: WE GOTTA GET 'EM TOGETHER

by

H. Burton Tingle

RATIONALE

Many times, in one problem, there will be several numbers which have to be worked with, and the order that you work with them will make a difference. This is the reason for using grouping symbols.

In this package, you will be studying order of operations and the use of grouping symbols.

Behavioral Objectives

Given any set of numbers to be added and/or subtracted and/or multiplied and/or divided, you should be able to give the correct answer with 90% accuracy-whether they have grouping symbols or not.

PRE-EVALUATION

1. $4 + 3 \times 2 =$

2. $6 \times 2 + 2 =$

3. $3 + 2 (1 + 3) =$

4. $5 + 2 \times 4 - 2 =$

5. $8 \div 4 \div 2 \times 1 =$

6. $4 + 3 \times 2 \div 1 + 1 - 3 =$

7. $4 \div 2 + 1 - 3 \times 1 \div 1 =$

8. $2 + 4 (3 + 2) - 4 (3 + 1) =$

9. $3 + [2 + 1 (4 - 3) - 2] + 1 =$

10. $5 + \{6 + 2 + 2 [7 - 3 (1 + 1) + 4] + 1\} =$

You must get 9 correct to skip over this package.

Information Sources

1. Listen to the teacher presentation.
2. Read Chapter 1 in the textbook.

G-1 Name _____

Find each answer. Try to do it without asking any questions. Do not compare answers.

1. $3 \times 4 + 2 =$ _____
2. $3 + 3 \times 2 =$ _____
3. $8 \div 4 + 4 =$ _____
4. $12 - 8 + 2 =$ _____
5. $14 + 8 + 2 =$ _____
6. $20 \div 10 \div 2 =$ _____
7. $40 \div 8 + 2 =$ _____
8. $7 - 5 - 2 =$ _____
9. $8 + 4 \div 2 =$ _____
10. $8 \times 4 + 3 =$ _____
11. $10 - 3 - 2 =$ _____
12. $10 + 3 \times 2 =$ _____
13. $100 \times 4 \div 2 =$ _____
14. $8 + 9 \div 3 =$ _____
15. $12 \div 3 \times 4 =$ _____
16. $40 \div 10 - 2 =$ _____
17. $20 - 4 \div 2 =$ _____
18. $60 + 3 \div 3 =$ _____
19. $18 - 3 \div 3 =$ _____
20. $18 - 11 - 2 =$ _____
21. $8 \div 2 + 1 =$ _____
22. $3 \div 2 - 1 =$ _____
23. $4 - 2 \div 2 =$ _____
24. $8 - 3 + 2 =$ _____
25. $12 \div 4 \div 2 =$ _____
26. $4 - 3 + 2 =$ _____
27. $4 \times 4 + 2 =$ _____
28. $5 \div 1 + 4 =$ _____
29. $3 - 2 + 1 =$ _____
30. $2 + 3 \div 2 =$ _____
31. $9 - 3 \div 1 =$ _____
32. $14 + 2 \div 4 =$ _____
33. $2 + 3 - 2 =$ _____
34. $4 + 5 \div 2 =$ _____
35. $2 \div 1 \times 5 =$ _____
36. $10 - 4 \div 2 =$ _____
37. $11 - 2 - 3 =$ _____
38. $24 \div 4 + 2 =$ _____
39. $2 \div 2 \times 2 =$ _____
40. $9 + 2 \div 2 =$ _____

G - 2

Name _____

Parentheses around 2 numbers mean that those two numbers are to be considered as one number; or do what is in the parenthesis first.

Example 1. 3 x (4 + 3) means 3 x 7 = 21 because (4 + 3) = 7.

Find each answer.

1. (3 x 4) + 2 = _____
2. 3 + (3 x 2) = _____
3. (8 ÷ 4) + 4 = _____
4. (12 - 8) + 2 = _____
5. 14 + (8 + 2) = _____
6. 20 ÷ (10 ÷ 2) = _____
7. 40 ÷ (8 + 2) = _____
8. (7 - 5) - 2 = _____
9. (8 + 4) ÷ 2 = _____
10. 8 x (4 + 3) = _____
11. 10 - (3 - 2) = _____
12. (10 + 3) x 2 = _____
13. 100 x (4 ÷ 2) = _____
14. (8 + 9) ÷ 3 = _____
15. (12 ÷ 3) x 4 = _____
16. 40 ÷ (10 - 2) = _____
17. 20 - (4 ÷ 2) = _____
18. (60 + 3) ÷ 3 = _____
19. 18 - (3 ÷ 3) = _____
20. 18 - (11 - 2) = _____
21. (8 ÷ 2) + 1 = _____
22. 3 ÷ (2 - 1) = _____
23. 4 - (2 ÷ 2) = _____
24. (8 - 3) + 2 = _____
25. 12 ÷ (4 ÷ 2) = _____
26. 4 - (3 + 2) = _____
27. 4 x (4 + 2) = _____
28. (5 ÷ 1) + 4 = _____
29. (3 - 2) + 1 = _____
30. (2 + 3) ÷ 2 = _____
31. 9 - (3 ÷ 1) = _____
32. 14 + (2 ÷ 4) = _____
33. (2 + 3) - 2 = _____
34. 4 + (5 ÷ 2) = _____
35. (2 ÷ 1) x 5 = _____
36. (10 - 4) ÷ 2 = _____
37. 11 - (2 - 3) = _____
38. 24 ÷ (4 + 2) = _____
39. (2 ÷ 2) x 2 = _____
40. 9 + (2 ÷ 2) = _____

G-3

Name _____

Find each answer

1. $3 \times (4 + 2) =$ _____
2. $(3 + 3) \times 2 =$ _____
3. $8 \div (4 + 4) =$ _____
4. $12 - (8 + 2) =$ _____
5. $(14 + 8) + 2 =$ _____
6. $(20 \div 10) \div 2 =$ _____
7. $(40 \div 8) + 2 =$ _____
8. $7 - (5 - 2) =$ _____
9. $8 + (4 \div 2) =$ _____
10. $(8 \times 4) + 3 =$ _____
11. $(10 - 3) - 2 =$ _____
12. $10 + (3 \times 2) =$ _____
13. $(100 \times 4) \div 2 =$ _____
14. $8 + (9 \div 3) =$ _____
15. $12 \div (3 \times 4) =$ _____
16. $(40 \div 10) - 2 =$ _____
17. $(20 - 4) \div 2 =$ _____
18. $60 + (3 \div 3) =$ _____
19. $(18-3) \div 3 =$ _____
20. $(18 - 11) - 2 =$ _____
21. $8 \div (2 + 1) =$ _____
22. $(3 \div 2) - 1 =$ _____
23. $(4 - 2) \div 2 =$ _____
24. $8 - (3 + 2) =$ _____
25. $(12 \div 4) \div 2 =$ _____
26. $(4 - 3) + 2 =$ _____
27. $(4 \times 4) + 2 =$ _____
28. $5 \div (1 + 4) =$ _____
29. $3 - (2 + 1) =$ _____
30. $2 + (3 \div 2) =$ _____
31. $(9 - 3) \div 1 =$ _____
32. $(14 + 2) \div 4 =$ _____
33. $2 + (3 - 2) =$ _____
34. $(4 + 5) \div 2 =$ _____
35. $2 \div (1 \times 5) =$ _____
36. $10 - (4 \div 2) =$ _____
37. $(11 - 2) - 3 =$ _____
38. $(24 \div 4) + 2 =$ _____
39. $2 \div (2 \times 2) =$ _____
40. $(9 + 2) \div 2 =$ _____

G-4 Name _____

Sometimes numbers appear without any grouping symbols. Because of this, we make the following agreement: Always multiply and divide before adding and subtracting. If there are only addition and subtraction signs, or only multiplication and division signs, proceed from left to right.

Example 1: $5 \times 2 + 3 = 13$ because we multiply before adding.

Example 2: $5 - 3 + 2 - 1 + 1 = 4$ proceeding from left to right.

Example 3: $5 + 2 \times 4 - 10 \div 2 + 1 = 9$ multiplying and dividing first, then adding and subtracting from left to right.

Find each answer

1. $3 \times 4 + 2 =$ _____
2. $3 + 3 \times 2 =$ _____
3. $8 \div 4 + 4 =$ _____
4. $12 - 8 + 2 =$ _____
5. $14 + 8 + 2 =$ _____
6. $20 \div 10 \div 2 =$ _____
7. $40 \div 8 + 2 =$ _____
8. $7 - 5 - 2 =$ _____
9. $8 + 4 \div 2 =$ _____
10. $8 \times 4 + 3 =$ _____
11. $10 - 3 - 2 =$ _____
12. $10 + 3 \times 2 =$ _____
13. $100 \times 4 \div 2 =$ _____
14. $8 + 9 \div 3 =$ _____
15. $12 \div 3 \times 4 =$ _____
16. $40 \div 10 - 2 =$ _____
17. $20 - 4 \div 2 =$ _____
18. $60 + 3 \div 3 =$ _____
19. $18 - 3 \div 3 =$ _____
20. $18 - 11 - 2 =$ _____
21. $8 \div 2 + 1 =$ _____
22. $3 \div 2 - 1 =$ _____
23. $4 - 2 \div 2 =$ _____
24. $8 - 3 + 2 =$ _____
25. $12 \div 4 \div 2 =$ _____
26. $4 - 3 + 2 =$ _____
27. $4 \times 4 + 2 =$ _____
28. $5 \div 1 + 4 =$ _____
29. $3 - 2 + 1 =$ _____
30. $2 + 3 \div 2 =$ _____
31. $9 - 3 \div 1 =$ _____
32. $14 + 2 \div 4 =$ _____
33. $2 + 3 - 2 =$ _____
34. $4 + 5 \div 2 =$ _____
35. $2 \div 1 \times 5 =$ _____
36. $10 - 4 \div 2 =$ _____
37. $11 - 2 - 3 =$ _____
38. $24 \div 4 + 2 =$ _____
39. $2 \div 2 \times 2 =$ _____
40. $9 + 2 \div 2 =$ _____

ACTIVITY

Work page 22: 1 - 24

ACTIVITY

Work page 24: 1 - 32

G-5 Name _____

Sometimes, it is necessary to use other grouping symbols besides parentheses. They are brackets, [ ] , and braces, { } . Generally speaking, they mean the same thing as parentheses; but are used to avoid confusion. When more than one grouping symbol is used, begin simplifying from the inside out.

Example 1:
$$\begin{aligned} 2 \times \{3 + 4 + [3 \times (4 \div 2)] + 2\} &= \\ 2 \times \{3 + 4 + [3 \times 2] + 2\} &= \\ 2 \times \{3 + 4 + 6 + 2\} &= \\ 2 \times 15 &= 30 \end{aligned}$$

Find each answer:

1. $[5 + 3 \times (2 + 1)] =$ _____

2. $\{6 - (3 \div 1) + 1 \times (2 + 3)\} =$ _____

3. $[14 - (2 \div 1) + 4] =$ _____

4. $3 + [4 + (3 \times 2) + 2] =$ _____

5. $[3 + 2 + (2 \times 3) - (1 \div 1) + 1] =$ _____

6. $\{8 + [3 + (4 \times 5) - 3 + 2]\} =$ _____

7. $\{9 + 2 \times [3 - (1 \times 2) + 4]\} + 2 =$ _____

8. $\{4 + 3 \times (2 + 1) + [2 \times (1 + 3)]\} - 1 =$ _____

9. $3 + \{2 + 3 \times [4 + 2(2 - 1)] + 3\} =$ _____

10. $6 \times \{10 - [2 + 4 \times (3 \div 3) + 1] + 1 \times (3 - 3)\} =$ _____

11. $4 + \{4 + 3 \times (2 + 1) + [2 \times (1 + 3) - 2]\} =$ _____

12. $10 \times \{4 + 4 + [3 \times (2 + 2) - 2] + 3 \times (1 + 4)\} =$ _____

13. $3 + \{3 \times [2 - (9 \div 9) + 2 \times (3 + 2)]\} - 11 =$ _____

ACTIVITY

Read p. 25, p. 32, p. 33.

1. What mathematics symbols were given to us by Thomas Harriot?

2. What was his profession, other than mathematics?

3. What do people in that profession do?

4. Name at least 3 different types of jobs that a surveyor might do.

5. How much education, particularly in mathematics, does a person need to be a surveyor? (Give your source of information)

6. What is cryptography?

7. Name at least two types of jobs where cryptography might be of use.